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TITLE OF THE INVENTION

PURCHASED COMMODITY ACCOMMODATING AND
TRANSPORTING APPARATUS HAVING SELF SCANNING FUNCTION AND
POS SYSTEM

BACKGROUND OF THE INVENTION

1) Field of the Invention

This invention relates to a purchased commodity
accommodating and transporting apparatus such as a
shopping cart (hand cart) or a shopping basket for use
in the distribution industry, particularly in a store
such a mass sales store, a convenience store or a
supermarket to allow a customer to accommodate and
transport a purchased commodity, and more particularly
to a purchased commodity accommodating and transporting
apparatus having a self scanning function to allow a
customer to purchase a commodity while the customer
~~itself~~ reads a commodity code such as a bar code, ^{attached} ~~applied~~
to the commodity and also to a POS (Point Of Sales)
system to which such purchased commodity accommodating
and transporting apparatus having a self scanning
function is applied.

2) Description of the Related Art

Generally, a POS system is employed in various
stores such as supermarkets and convenience stores. In
the POS system, a customer walks around in a store
pushing a shopping cart or carrying a shopping basket,

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places commodities to be purchased into the shopping cart or the shopping basket, and comes to a settlement POS terminal (POS register).

Then at the settlement POS terminal, an operator takes out the commodities one by one from the shopping cart or the shopping basket and reads the bar codes (commodity codes) applied to the commodities by means of a scanner to effect registration processing. In particular, in accordance with commodity code information read from each bar code, the price of the commodity corresponding to the commodity code is retrieved from a commodity price file (PLU (Price Look Up) file), and a total amount of money of the purchased commodities is calculated to settle the accounts.

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With such POS system, however, since an operator must perform a reading operation of a commodity code of each commodity, much time is required for such reading operation and a settling operation, which causes the customer to wait for a long time. Accordingly, in a time band in which customers are crowded, a queue of customers is produced in front of a settlement POS terminal, and ^{additionally, produces a heavy} ~~besides, the~~ burden on the operator ~~is~~ heavy.

Thus, in recent years, a shopping cart (scanning cart) or a shopping basket having a scanner (commodity code reading section) for reading a bar code (commodity code) applied to a commodity has been developed and are

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1 disclosed in various publications including, for
example, Japanese Patent Laid-Open Applications No.
Showa 63-145591, No. Heisei 2-277412 and No. Heisei 5-
81559.

5 In a POS system which employs a shopping cart or
a shopping basket of the type mentioned, a customer
B ~~itself~~ reads a bar code applied to a commodity to be
purchased by means of the scanner to register the
commodity code information and places or accommodates
10 the commodity into an accommodating section of the
shopping cart or the shopping ^{basket.} ~~basket, and then after~~
B Thereafterafter
B selection of commodities to be purchased is completed,
the commodities are placed into the shopping cart or the
shopping basket and transported to a settlement POS
15 terminal.

Then at the settlement POS terminal, the
commodity code information (or commodity price
information corresponding to the commodity code
information) registered by the customer ~~itself~~ is ^{down} loaded
20 ~~down~~, and a total amount of money of the purchased
commodities is calculated based on the commodity code
information (commodity price information) to effect
settlement of the accounts.

With the POS system, an operator ^{longer needs to} ~~no more need~~
25 read the commodity codes of commodities one by one, and
the time (register operation time) required for reading,
processing and settling processing can be reduced
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1 significantly. Consequently, the customer ^{no longer needs to} ~~need not~~ wait
for a long time any more and also the burden on the
operator can be reduced remarkably.

5 In the POS system wherein an operator performs a
reading operation for a commodity code to register the
commodity, commodity registration of all of commodities
accommodated in a shopping cart or a shopping basket is
performed upon settlement of accounts. Accordingly,
unless an intentional unjust act (shoplifting or the
10 like) is performed, ^{taking out} ~~such unjust act that~~ a commodity is
~~taken out~~ without settlement of accounts can be
prevented.

^{Additionally}
~~However,~~ conventional purchased commodity
accommodating and transporting ^{apparatuses} ~~apparatus~~ having a self
15 scanning function described above or POS systems which
employ such ^{an} ~~apparatus~~ ^{do} ~~does~~ not include established means
for detecting whether or not all commodities
accommodated in a shopping cart or a shopping basket
have been registered for commodity registration (the
20 commodity codes haven been read), and the countermeasure
against the case wherein a customer has placed a
commodity into a shopping cart or a shopping basket
without reading the commodity code by means of the
scanner is not sufficient in the present situation.

25 For example, even if a customer fails to read a
commodity code by means of the scanner, the commodity
can be accommodated as it is, and an operator may


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B 1 possibly settle the accounts without ~~getting~~^{being} aware of
such commodity. Accordingly, an unjust act such as
B shoplifting can be performed readily ^{regardless of} whether it is
intentional or accidental.

B 5 In order to prevent such unjust acts, means ^{have} ~~has~~
been proposed for causing, when a commodity code is read
by means of a scanner, the color of the commodity code
to be changed or for jetting colored ink to an area of
the commodity code to clearly indicate that reading of
10 the commodity code has been completed.

B With the means, however, the color change
condition or the application condition of ink must be
checked, upon settlement of accounts, for the commodity
codes of all commodities, and the burden on an operator
15 cannot be reduced. Further, when ~~it is tried~~^{one tries} to return
a commodity for which reading of the commodity code has
been performed ^{having intruded} ~~once intending~~ to purchase the commodity,
B the commodity code cannot be returned immediately to its
condition before such reading, and a shopman must
20 perform re-attachment of a commodity code (bar code) or
a like operation. Further, the means which employs
jetting of colored ink is not preferable in terms of
sanitation where the commodity is food or the like.

C ^{Furthermore} ~~Meanwhile~~, in a conventional purchased commodity
25 accommodating and transporting apparatus having a self
scanning function described above or a POS system which
employs the apparatus, since a final settling operation



1 of accounts by an operator must be performed with a
settlement POS terminal, a customer must wait for some
interval of time at the settlement POS terminal, which
imposes a burden on ~~an operation~~ of the operator.
5 Therefore, it is ~~expected~~^{desired} to allow operations up to
final settlement of accounts to be performed with each
purchased commodity accommodating and transporting
apparatus, while preventing an unjust act, to achieve
10 ^a reduction of the burden on an operator, ^a reduction of the
number of operators and smoothing ^{the} of a flow of
customers.

SUMMARY OF THE INVENTION

It is an object of the present invention to
15 provide a purchased commodity accommodating and
transporting apparatus having a self scanning function
and a POS system which ~~prevent~~^{prevents} an unjust act such as ~~to~~
~~carry out~~^{carrying} a commodity without reading a commodity code
(commodity registration) whether it is intentional or
20 accidental.

It is another object of the present invention to
provide a purchased commodity accommodating and
transporting apparatus having a self scanning function
and a POS system which allows operations up to final
25 settlement of accounts to be performed by self service
to achieve ^a reduction of the burden to an operator and ^a
reduction of the number of operators and ^{to provide} ~~realize~~

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1 agreeable shopping ^{for} ~~of~~ a customer without ^{any} ~~any~~ waiting time.

10 In order to attain the objects described above,
according to an aspect of the present invention, there
is provided a purchased commodity accommodating and
5 transporting apparatus having a self scanning function,
which comprises a commodity code reading section for
reading a commodity code applied to a commodity, an
accommodation section for accommodating therein a
commodity whose commodity code has been read by the
10 commodity code reading section, a weighing equipment for
measuring the total weight of commodities accommodated
in the accommodation section, a weight determination
section for detecting the variation of the total weight
of the commodities in the accommodation section measured
15 by the weighing equipment, and an alarm generation
section for generating an alarm when it is determined by
the weight determination section that the total weight
of the commodities in the accommodation section measured
by the weighing equipment has changed without reading a
20 commodity code by the commodity code reading section.

The purchased commodity accommodating and
transporting apparatus may further comprise an alarm
cancellation section for cancelling the alarm generated
from the alarm generation section when it is determined
25 by the weight determination section that the total
weight of the commodities in the accommodation section,
which changed without reading a commodity code by the



1 commodity code reading section, has returned to its
original weight before the change.

With the purchased commodity accommodating and
transporting apparatus having a self scanning function,
5 when it is determined by the weight determination
section that the total weight of commodities in the
accommodation section has changed without scanning a
commodity code, an alarm is immediately generated there
to give a warning to the customer. Consequently, such
10 an unjust act as to carry out a commodity without
reading a commodity code whether it is intentional or
accidental can be prevented with certainty without
giving a disagreeable feeling to the customer.

According to another aspect of the present
15 invention, there is provided a POS system which
comprises a plurality of purchased commodity
accommodating and transporting apparatus having a self
scanning function and each including a commodity code
reading section for reading a commodity code applied to
20 a commodity, and an accommodation section for
accommodating therein a commodity whose commodity code
has been read by the commodity code reading section, and
a management section for managing the purchased
commodity accommodating and transporting apparatus, each
25 of the purchased commodity accommodating and
transporting apparatus including a weighing equipment
for measuring the total weight of commodities

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1 accommodated in the accommodation section, a weight
determination section for detecting the variation of the
total weight of the commodities in the accommodation
section measured by the weighing equipment, an alarm
5 generation section for generating an alarm when it is
determined by the weight determination section that the
total weight of the commodities in the accommodation
section measured by the weighing equipment has changed
without reading a commodity code by the commodity code
10 reading section, a timer for counting an alarm
generation time by the alarm generation section, a timer
determination section for determining whether or not the
counted time by the timer reaches a predetermined time,
and an error transmission section for transmitting, when
15 it is determined by the timer determination section that
the counted time by the timer has reached the
predetermined time, unique information of the purchased
commodity accommodating and transporting apparatus as
error information to the management section.


20 The management section may include an error
reception section for receiving the error information
from the error transmission section of any of the
purchased commodity accommodating and transporting
apparatus, an error display section for displaying, when
25 the error information is received by the error reception
section, the unique information of one of the purchased
commodity accommodating and transporting apparatus from

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1 which the error information has been transmitted, and an
error cancellation section for cancelling the display of
the unique information of the one purchased commodity
accommodating and transporting apparatus on the error
5 display section when a countermeasure for the one
purchased commodity accommodating and transporting
apparatus, from which the error information has been
transmitted, is completed.

With the POS system, if a customer ignores such
10 an alarm as described above and does not take out the
commodity for which scanning has not been performed,
then the unique information of the purchased commodity
accommodating and transporting apparatus with which the
unjust act has been performed is transmitted as error
15 information to and displayed on the management section.
Consequently, some countermeasure can be taken
immediately for the customer who has conducted the
unjust act.

According to a further aspect of the present
20 invention, there is provided a purchased commodity
accommodating and transporting apparatus having a self
scanning function, which comprises a commodity code
reading section for reading a commodity code applied to
a commodity, an accommodation section for accommodating
25 therein a commodity whose commodity code has been read
by the commodity code reading section, a weighing
equipment for measuring the total weight of commodities



1 accommodated in the accommodation section, a commodity
weight retrieval section for retrieving the weight of a
commodity in accordance with the commodity code
information read by the commodity code reading section,
5 a weight comparison section for comparing the weight of
the commodity retrieved by the commodity weight
retrieval section and the increment of the total weight
of the commodities in the accommodation section after
reading of the commodity code information measured by
10 the weighing equipment, and an alarm generation section
for generating an alarm when it is determined by the
weight comparison section that the weight of the
commodity retrieved by the commodity weight retrieval
section and the increment of the total weight of the
15 commodities in the accommodation section after reading
of the commodity code measured by the weighing
equipment are different from each other.

The purchased commodity accommodating and
transporting apparatus may further comprise a weight
20 determination section for detecting the variation of the
total weight of the commodities in the accommodation
section measured by the weighing equipment, and wherein
the alarm generation section generates an alarm when it
is determined by the weight determination section that
25 the total weight of the commodities in the accommodation
section measured by the weighing equipment has changed
without reading a commodity code by the commodity code

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1 reading section.

According to a still further aspect of the present invention, there is provided a POS system which comprises a plurality of purchased commodity
5 accommodating and transporting apparatus having a self scanning function and each including a commodity code reading section for reading a commodity code applied to a commodity, a commodity code registration section for registering the commodity code information read by the
10 commodity code reading section, and an accommodation section for accommodating therein a commodity whose commodity code has been read by the commodity code reading section, a commodity information file for storing price information of commodities corresponding
15 to the commodity code information as commodity information, and a settlement POS terminal for retrieving the commodity information file in accordance with the commodity code information registered in the commodity code registration section of any of the
20 purchased commodity accommodating and transporting apparatus to perform final settlement of accounts for purchased commodities accommodated in the accommodation section of the purchased commodity accommodating and transporting apparatus, the commodity information file
25 storing weight information of individual commodities corresponding to the commodity code information as commodity information, each of the purchased commodity

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1 accommodating and transporting apparatus including a
weighing equipment for measuring the total weight of
commodities accommodated in the accommodation section,
and a data transmission section for transmitting, upon
5 settlement of accounts at the settlement POS terminal,
the total weight of the commodities in the accommodation
section measured by the weighing equipment to the
settlement POS terminal, the settlement POS terminal
including a data reception section for receiving data
10 from the data transmission section of any of the
purchased commodity accommodating and transporting
apparatus, a commodity weight retrieval section for
retrieving the weights of the commodities corresponding
to the commodity code information from the commodity
15 information file in accordance with the commodity code
information of all commodities registered by the
commodity code registration section, a total weight
calculation section for calculating the total weight of
the weights of the commodities retrieved by the
20 commodity weight retrieval section, a weight comparison
section for comparing the total weight calculated by the
total weight calculation section and the total weight of
the commodities in the accommodation section received by
the data reception section, and an alarm generation
25 section for generating an alarm when it is determined by
the weight comparison section that the total weight
calculated by the total weight calculation section and

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1 the total weight of the commodities in the accommodation
section received by the data reception section are
different from each other.

Each of the purchased commodity accommodating
5 and transporting apparatus may include a weight
determination section for detecting the variation of the
total weight of the commodities in the accommodation
section measured by the weighing equipment, and an alarm
generation section for generating an alarm when it is
10 determined by the weight determination section that the
total weight of the commodities in the accommodation
section measured by the weighing equipment has changed
without reading a commodity code by the commodity code
reading section.

15 With the purchased commodity accommodating and
transporting apparatus having a self scanning function
and the POS system, when it is determined that an actual
increment in weight and the weight corresponding to
commodity code information are different from each
20 other, or when it is determined that the total weight
calculated in accordance with the commodity code
information and the total weight of the commodities
actually measured by the weighing equipment are
different from each other, an error is notified.
25 Consequently, such an intentional unjust act as to
register a single commodity and accommodate a plurality
of commodities at a time into the accommodation or to

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1 accommodate a commodity into the accommodation section
without registering the same and such an accidental
unjust act as a miss of scanning or an error in scanning
can be detected. Accordingly, those unjust acts can be
5 prevented with certainty. Further, the safety
equivalent to that of a conventional POS system, in
which settlement of accounts is performed by a scanning
operation of an operator, can be provided to the store
side which adopts the present POS system, and better
10 services can be provided to the store side and
customers.

According to a yet further aspect of the present
invention, there is provided a purchased commodity
accommodating and transporting apparatus having a self
15 scanning function, which comprises a commodity code
reading section for reading a commodity code applied to
a commodity, a commodity code registration section for
registering the commodity code information read by the
commodity code reading section, an accommodation section
20 for accommodating therein a commodity whose commodity
code has been read by the commodity code reading
section, the commodity code reading section being used
to read, upon settlement of accounts, the commodity code
of a commodity selected at random from the commodities
25 accommodated in the accommodation section, a commodity
registration determination section for determining
whether or not the commodity code information read by

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1 the commodity code reading section upon settlement of
accounts is registered in the commodity code
registration section, and an error notification section
for notifying an error when it is determined by the
5 commodity registration determination section upon
settlement of accounts that the commodity code
information read by the commodity code reading section
is not registered.

According to a yet further aspect of the present
10 invention, there is provided a purchased commodity
accommodating and transporting apparatus having a self
scanning function, which comprises a commodity code
reading section for reading a commodity code applied to
a commodity, a commodity code registration section for
15 registering the commodity code information read by the
commodity code reading section, an accommodation section
for accommodating therein a commodity whose commodity
code has been read by the commodity code reading
section, the commodity code reading section being used
20 to read, upon settlement of accounts, the commodity code
of a commodity selected at random from the commodities
accommodated in the accommodation section, and a
commodity registration determination section for
determining whether or not the commodity code
25 information read by the commodity code reading section
upon settlement of accounts is registered in the
commodity code registration section, the commodity code

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1 registration section automatically registering the
commodity code information read by the commodity code
reading section when it is determined upon settlement of
accounts by the commodity registration determination
5 section that the commodity code information is not
registered.

The purchased commodity accommodating and
transporting apparatus may further comprise an error
notification section for notifying an error when it is
10 determined upon settlement of accounts by the commodity
registration determination section that the commodity
code information read by the commodity code reading
section is not registered.

With the purchased commodity accommodating and
15 transporting apparatus having a self scanning function,
if a commodity which has been accommodated into the
accommodation section without scanning the commodity
code by a customer whether it is intentional or
accidental is detected upon settlement of accounts by
20 random scanning checking by an operator, then the unjust
act can be notified as an error and the commodity can be
automatically registered. Consequently, such an unjust
act as shoplifting by a customer can be prevented by a
restraining effect on a temptation to an unjust act
25 without imposing a burden on the operator of the
settlement POS terminal and without taking such a
countermeasure as to change the color of the commodity

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1 code, and occurrence of unjust acts upon introduction of
a POS system which involves self scanning can be
prevented with certainty.

According to a yet further aspect of the present
5 invention, there is provided a POS system which
comprises a plurality of purchased commodity
accommodating and transporting apparatus having a self
scanning function and each including a commodity code
reading section for reading a commodity code applied to
10 a commodity, a commodity code registration section for
registering the commodity code information read by the
commodity code reading section, and an accommodation
section for accommodating therein a commodity whose
commodity code has been read by the commodity code
15 reading section, and a settlement POS terminal for
performing final settlement of accounts for purchased
commodities accommodated in the accommodation section of
any of the purchased commodity accommodating and
transporting apparatus in accordance with the commodity
20 code information registered in the commodity code
registration section of the purchased commodity
accommodating and transporting apparatus, the settlement
POS terminal including a resonance tag detection section
for detecting a resonance tag applied in advance to each
25 commodity to detect the number of the commodities
accommodated in the accommodation section of any of the
purchased commodity accommodating and transporting

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1 apparatus, and a commodity number comparison section for
comparing the number of the commodities detected by the
resonance tag detection section and the number of
registered commodities obtained in accordance with the
5 commodity code information registered by the commodity
code registration section.

With the purchased commodity accommodating and
transporting apparatus having a self scanning function,
since the registered number of commodities and the
10 number of actual commodities detected by the resonance
tag detection section of the settlement POS terminal are
compared with each other and a result of the comparison
is notified, presence or absence of a non-registered
commodity can be confirmed readily at the settlement POS
15 terminal and notified to the customer. Consequently,
occurrence of unjust acts upon introduction of a POS
system which involves self scanning can be prevented
with certainty.

According to a yet further aspect of the present
20 invention, there is provided a purchased commodity
accommodating and transporting apparatus having a self
scanning function, which comprises a commodity code
reading section for reading a commodity code applied to
a commodity, an accommodation section for accommodating
25 therein a commodity whose commodity code has been read
by the commodity code reading section, a prepaid card
inputting processing section for receiving a prepaid

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1 card and reading remains information of the prepaid
card, a commodity price retrieval section for retrieving
the price of the commodity in accordance with the
commodity code information read by the commodity code
5 reading section, and a data updating section for
registering a result obtained by subtraction of the
price of the commodity retrieved by the commodity price
retrieval section from the remains information read by
the prepaid card inputting processing section as remains
10 information of the prepaid card to update the remains
information.

The purchased commodity accommodating and
transporting apparatus may further comprise a
notification section for notifying, when the remains
15 read by the prepaid card inputting processing section
runs short of the price of the commodity retrieved by
the commodity price retrieval section, such shortage,
and or a selection section for selecting, when the
remains read by the prepaid card inputting processing
20 section runs short of the price of the commodity
retrieved by the commodity price retrieval section,
whether the purchasing processing is to be continued
inserting a second prepaid card into the prepaid card
inputting processing section or the purchasing
25 processing is to be ended.

The purchased commodity accommodating and
transporting apparatus may further comprise a receipt

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1 issuance section for issuing a receipt upon completion
of the purchasing, and/or a receipt issuance selection
section for selecting whether the issuance of a receipt
by the receipt issuance section is necessary or
5 unnecessary.

According to a yet further aspect of the present
invention, there is provided a purchased commodity
accommodating and transporting apparatus having a self
scanning function, which comprises a commodity code
10 reading section for reading a commodity code applied to
a commodity, an accommodation section for accommodating
therein a commodity whose commodity code has been read
by the commodity code reading section, a magnetic card
reading section for receiving a credit card or a bank
15 card and reading magnetic information of the card, a
commodity price retrieval section for retrieving the
price of the commodity in accordance with the commodity
code information read by the commodity code reading
section, and an automatic clearing processing section
20 for automatically clearing the amount of money
corresponding to the price of the commodity retrieved by
the commodity price retrieval section from an account
corresponding to the magnetic information of the card
read by the magnetic card reading section ^{at} some other
25 ^{time} ~~day~~.

The purchased commodity accommodating and
transporting apparatus may further comprise a prepaid

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1 card inputting processing section for receiving a
prepaid card and reading the remains information of the
prepaid card, and a data updating section for
registering a result obtained by subtraction of the
5 price of the commodity retrieved by the commodity price
retrieval section from the remains information read by
the prepaid card inputting processing section as remains
information of the prepaid card to update the remains
information.

10 The purchased commodity accommodating and
transporting apparatus may further comprise a data
reception section for receiving data from a management
section, and a power on/off drive section for
automatically turning the power source on/off in
15 response to a power on/off instruction received from the
management section by way of the data reception section,
and/or may further comprise a weighing equipment for
measuring the total weight of commodities accommodated
in the accommodation section, a weight determination
20 section for detecting the variation of the total weight
of the commodities in the accommodation section measured
by the weighing equipment, and an alarm generation
section for generating an alarm when it is determined by
the weight determination section that the total weight
25 of the commodities in the accommodation section measured
by the weighing equipment has changed without reading a
commodity code by the commodity code reading section.

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1 With the purchased commodity accommodating and
transporting apparatus having a self scanning function,
since final settlement of accounts can be performed by
self service using a prepaid card, a bank card or a
5 credit cart, not only reduction of the burden on an
operator and reduction of the number of operators can be
achieved, but agreeable shopping free from a waiting
time at a settlement POS terminal can be achieved and
remarkable reduction of the shopping time and remarkable
10 enhancement in convenience in a self shopping form can
be realized.

 Further objects, features and advantages of the
present invention will become apparent from the
following detailed description when read in conjunction
15 with the accompanying drawings in which like parts or
elements are denoted by like reference characters.

BRIEF DESCRIPTION OF THE DRAWINGS

 FIGS. 1 to 6 are block diagrams illustrating
20 different aspects of the present invention;

 FIG. 7 is a block diagram showing a functional
construction of a purchased commodity accommodating and
transporting apparatus and a POS system according to a
first preferred embodiment of the present invention;

25 FIG. 8 is a block diagram showing a hardware
construction of a control system of the purchased
commodity accommodating and transporting apparatus shown

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1 in FIG. 7;

FIG. 9 is a block diagram showing a hardware construction of a management section of the POS system shown in FIG. 7;

5 FIG. 10 is a perspective view showing a cart section of the purchased commodity accommodating and transporting apparatus shown in FIG. 7;

FIG. 11 is a perspective view showing an accommodating section of the purchased commodity
10 accommodating and transporting apparatus shown in FIG. 7;

FIG. 12 is a schematic view showing an exemplary alarm display of a display section of the purchased commodity accommodating and transporting apparatus shown
15 in FIG. 7;

FIG. 13 is a view showing an exemplary display of an error display section and an error cancellation section of the management section shown in FIG. 7;

FIG. 14 is a flow chart illustrating operation
20 of the POS system shown in FIG. 7;

FIG. 15 is a block diagram showing a functional construction of a purchased commodity accommodating and transporting apparatus according to a second preferred embodiment of the present invention;

25 FIG. 16 is a block diagram showing a hardware construction of a control system of the purchased commodity accommodating and transporting apparatus shown

25

1 in FIG. 15;

FIG. 17 is a flow chart illustrating operation of the purchased commodity accommodating and transporting apparatus shown in FIG. 15;

5 FIG. 18 is a block diagram showing a functional construction of a POS system according to a third preferred embodiment of the present invention;

FIG. 19 is a block diagram showing a hardware construction of a control system of a purchased commodity accommodating and transporting apparatus in the POS system shown in FIG. 18;

FIG. 20 is a block diagram showing a hardware construction of a settlement POS terminal employed in the POS system shown in FIG. 18;

15 FIG. 21 is a flow chart illustrating operation of the POS system shown in FIG. 18;

FIG. 22 is a block diagram showing a functional construction of a purchased commodity accommodating and transporting apparatus according to a fourth preferred embodiment of the present invention;

FIG. 23 is a flow chart illustrating operation of the purchased commodity accommodating and transporting apparatus shown in FIG. 22;

25 FIG. 24 is a block diagram showing a functional construction of a POS system according to a fifth preferred embodiment of the present invention;

FIG. 25 is a block diagram showing a hardware

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1 construction of a settlement POS terminal employed in
the POS system shown in FIG. 24;

FIG. 26 is a block diagram showing a hardware
construction of a controller or upper control section of
5 the POS system shown in FIG. 24;

FIG. 27 is a view showing an exemplary display
of a display section of a purchased commodity
accommodating and transporting apparatus of the POS
system shown in FIG. 24;

10 FIG. 28 is a flow chart illustrating operation
of the POS system shown in FIG. 24;

FIG. 29 is a block diagram showing a functional
construction of a purchased commodity accommodating and
transporting apparatus according to a sixth preferred
15 embodiment of the present invention;

FIG. 30 is a block diagram showing a hardware
construction of a control system of the purchased
commodity accommodating and transporting apparatus shown
in FIG. 29;

20 FIG. 31 is a perspective view showing an
accommodation section of the purchased commodity
accommodating and transporting apparatus shown in FIG.
29;

FIG. 32 is a flow chart illustrating operation
25 of the purchased commodity accommodating and
transporting apparatus shown in FIG. 29; and

FIG. 33 is a block diagram showing a functional

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1 construction of a modification to the purchased
commodity accommodating and transporting apparatus shown
in FIG. 29.

5 DESCRIPTION OF THE PREFERRED EMBODIMENTS

a. Aspects of the Invention

Referring first to FIG. 1, there is illustrated
an aspect of the present invention. The aspect
illustrated is directed to a POS system which includes a
10 plurality of purchased commodity accommodating and
transporting apparatus 1 (only one is shown in FIG. 1)
having a self scanning function, and a management
section 8 for managing the purchased commodity
accommodating and transporting apparatus 1. Each of the
15 purchased commodity accommodating and transporting
apparatus 1 includes a commodity code reading section 2
for reading a commodity code 50a applied to a commodity
50 and an accommodation section 3 for accommodating
therein a commodity 50 whose commodity code 50a has been
20 read by the commodity code reading section 2. The
purchased commodity accommodating and transporting
apparatus further includes a weighing equipment 4, a
weight determination section 5, an alarm generation
section 6, an alarm cancellation section 7, a timer 9, a
25 timer determination section 10, and an error
transmission section 11.

The weighing equipment 4 measures the total



1 weight of commodities 50 accommodated in the
accommodation section 3, and the weight determination
section 5 detects the variation of the total weight of
the commodities 50 in the accommodation section 3
5 measured by the weighing equipment 4.

The alarm generation section 6 generates an
alarm when it is determined by the weight determination
section 5 that the total weight of the commodities 50 in
the accommodation section 3 measured by the weighing
10 equipment 4 has changed without reading a commodity code
50a by the commodity code reading section 2. The alarm
cancellation section 7 cancels the alarm generated from
the alarm generation section 6 when it is determined by
the weight determination section 5 that the total weight
15 of the commodities 50 in the accommodation section 3,
which changed without reading a commodity code 50a by
the commodity code reading section 2, has returned to
its original weight before the change.

The timer 9 counts an alarm generation time by
20 the alarm generation section 6, and the timer
determination section 10 determines whether or not the
counted time by the timer 9 reaches a predetermined
time. The error transmission section 11 transmits, when
it is determined by the timer determination section 10
25 that the counted time by the timer 9 has reached the
predetermined time, unique information of the purchased
commodity accommodating and transporting apparatus 1 as

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1 error information to the management section 8.

Meanwhile, the management section 8 includes an error reception section 12, an error display section 13, and an error cancellation section 14.

5 The error reception section 12 receives error information from the error transmission section 11 of any of the purchased commodity accommodating and transporting apparatus 1. The error display section 13 displays, when such error information is received by the error reception section 12, the unique information of one of the purchased commodity accommodating and transporting apparatus 1 from which the error information has been transmitted, and the error cancellation section 14 cancels the display of the unique information of the one purchased commodity accommodating and transporting apparatus 1 on the error display section 13 when a countermeasure for the one purchased commodity accommodating and transporting apparatus 1, from which the error information has been transmitted, is completed.

In the POS system and the purchased commodity accommodating and transporting apparatus 1 described above with reference to FIG. 1, while a customer uses the purchased commodity accommodating and transporting apparatus 1 in order to purchase commodities, the total weight of commodities 50 accommodated in the accommodation section 3 of the purchased commodity

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1 accommodating and transporting apparatus 1 is measured
by the weighing equipment 4, and the variation of the
total weight of the commodities 50 in the accommodation
section 3 from the weighing equipment 4 is detected by
5 the weight determination section 5.

Then, if it is determined by the weight
determination section 5 that the total weight of the
commodities 50 in the accommodation section 3 measured
by the weighing equipment 4 has changed without reading
10 a commodity code 50a by the commodity code reading
section 2, it is determined that the customer has
accommodated or taken out a commodity 50 into or from
the accommodation section 3 without performing reading
(scanning) of the commodity code 50a, and an alarm is
15 generated from the alarm generation section 6.

If it is determined by the weight determination
section 5 after generation of the alarm that the total
weight has returned to its original weight before the
change, then it is determined that the commodity 50
20 which was accommodated into the accommodation section 3
by the customer without reading the commodity code 50a
has been taken out from within the accommodation section
3, and the alarm generated by the alarm generation
section 6 is immediately canceled by the alarm
25 cancellation section 7.

On the other hand, when the alarm generated by
the alarm generation section 6 is not canceled by the

1 alarm cancellation section 7, the alarm generation time
by the alarm generation section 6 is counted by the
timer 9, and it is determined by the timer determination
section 10 whether or not the counted time by the timer
5 9 reaches the predetermined time.

If it is determined by the timer determination
section 10 that the counted time by the timer 9 reaches
the predetermined time, then unique information of the
purchased commodity accommodating and transporting
10 apparatus 1 is transmitted as error information to the
management section 8 by the error transmission section
11.

Then, on the management section 8 side to which
the error information is transmitted, when the error
15 information from the error transmission section 11 of
the purchased commodity accommodating and transporting
apparatus 1 is received by the error reception section
12, the unique information of the purchased commodity
accommodating and transporting apparatus 1 from which
20 the error information has been transmitted is displayed
on the error display section 13.

The display of the unique information of the
purchased commodity accommodating and transporting
apparatus 1 on the error display section 13 continues
25 until after some countermeasure is taken for the
purchased commodity accommodating and transporting
apparatus 1 from which the error information has been

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1 transmitted, and after the countermeasure is taken, the
display is canceled by the error cancellation section
14.

With the purchased commodity accommodating and
5 transporting apparatus having a self scanning function
and the POS system described above with reference to
FIG. 1, the following advantages can be achieved.

1. When it is determined by the weight
determination section 5 that the total weight of
10 commodities 50 in the accommodation section 3 has
changed without scanning a commodity code 50a, an alarm
is immediately generated there to give a warning to the
customer. Consequently, such an unjust act as to carry
out a commodity without reading a commodity code whether
15 it is intentional or accidental can be prevented with
certainty without giving a disagreeable feeling to the
customer.

2. If the customer ignores such an alarm as
described above and does not take out the commodity 50
20 for which scanning has not been performed, then the
unique information of the purchased commodity
accommodating and transporting apparatus 1 with which
the unjust act has been performed is transmitted as
error information to and displayed on the management
25 section 8. Consequently, some countermeasure can be
taken immediately for the customer who has conducted the
unjust act.

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1 Referring now to FIG. 2, there is illustrated
another aspect of the present invention. The aspect
illustrated is directed to a purchased commodity
accommodating and transporting apparatus 1 having a self
5 scanning function. The purchased commodity
accommodating and transporting apparatus 1 comprises a
commodity code reading section 2, an accommodating
section 3, a weighing equipment 4 and an alarm
generation section 6 similar to those shown in FIG. 1.
10 The purchased commodity accommodating and transporting
apparatus 1 further comprises a commodity weight
retrieval section 15 and a weight comparison section 16.

The commodity weight retrieval section 15
retrieves the weight of a commodity 50 in accordance
15 with the commodity code information read by the
commodity code reading section 2, and the weight
comparison section 16 compares the weight of the
commodity 50 retrieved by the commodity weight retrieval
section 15 and the increment of the total weight of the
20 commodities 50 in the accommodation section 3 after
reading of the commodity code information measured by
the weighing equipment 4.

The alarm generation section 6 generates an
alarm when it is determined by the weight comparison
25 section 16 that the weight of the commodity 50 retrieved
by the commodity weight retrieval section 15 and the
increment of the total weight of the commodities 50 in

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1 the accommodation section 3 after reading of the
commodity code measured by the weighing equipment 4 are
different from each other.

The purchased commodity accommodating and
5 transporting apparatus 1 may further comprise a weight
determination section 5 similar to that shown in FIG. 1
such that the alarm generation section 6 generates an
alarm when it is determined by the weight determination
section 5 that the total weight of the commodities 50 in
10 the accommodation section 3 measured by the weighing
equipment 4 has changed without reading a commodity code
50a by the commodity code reading section 2.

With the purchased commodity accommodating and
transporting apparatus having a self scanning function
15 described above with reference to FIG. 2, the weight of
a commodity 50 is retrieved by the commodity weight
retrieval section 15 in accordance with the commodity
code information read by the commodity code reading
section 2, and the weight of the commodity 50 retrieved
20 by the commodity weight retrieval section 15 and an
increment in total weight of the commodities 50 in the
accommodation section 3 after reading of the commodity
codes measured by the weighing equipment 4 are compared
with each other by the weight comparison section 16.

25 If it is determined by the weight comparison
section 16 that the weight of the commodity 50 retrieved
by the commodity weight retrieval section 15 and the

35

1 actual increment in total weight of the commodities 50
in the accommodation section 3 measured by the weighing
equipment 4 are different from each other, then it is
determined that the customer has accommodated the
5 commodity 50 into the accommodation section 3 without
scanning the commodity code 50a or the customer has
placed into the accommodation section 3 a different
commodity from an actually scanned commodity or some
other unjust act has taken place. Consequently, an
10 alarm is generated from the alarm generation section 6.

In this instance, similarly as in the purchased
commodity accommodating and transporting apparatus 1
shown in FIG. 1, when it is determined by the weight
determination section 5 that the total weight of the
15 commodities 50 in the accommodation section 3 from the
weighing equipment 4 has changed without scanning a
commodity code 50a by the commodity code reading section
2, an alarm can be generated immediately by the alarm
generation section 6.

20 Referring now to FIG. 3, there is illustrated a
further aspect of the present invention. The aspect
illustrated is directed to a POS system which includes a
plurality of purchased commodity accommodating and
transporting apparatus 1 (only one is shown in FIG. 3)
25 having a self scanning function, a commodity information
file 18, and a settlement POS terminal 19. Each of the
purchased commodity accommodating and transporting

1 apparatus 1 includes, in addition to a commodity code
reading section 2, an accommodation section 3, and a
weighing equipment 4 similar to those shown in FIG. 1, a
commodity code registration section 17, and a data
5 communication section 20. The commodity code
registration section 17 registers commodity code
information read by the commodity code reading section
2. The data transmission section 20 transmits, upon
settlement of accounts at the settlement POS terminal
10 19, the total weight of the commodities 50 in the
accommodation section 3 measured by the weighing
equipment 4 to the settlement POS terminal 19.

The commodity information file 18 stores price
information of commodities 50 corresponding to commodity
15 code information as commodity information. In the
present invention, the commodity information file 18
also stores weight information of individual commodities
50 corresponding to the commodity code information as
commodity information.

20 The settlement POS terminal 19 retrieves the
commodity information file 18 in accordance with the
commodity code information registered in the commodity
code registration section 17 of any of the purchased
commodity accommodating and transporting apparatus 1 to
25 perform final settlement of accounts for purchased
commodities accommodated in the accommodation section 3
of the purchased commodity accommodating and

1 transporting apparatus 1. The settlement POS terminal
19 includes a data reception section 21, a commodity
weight retrieval section 22, a total weight calculation
section 23, a weight comparison section 24, and an alarm
5 generation section 25.

The data reception section 21 receives data from
the data transmission section 20 of any of the purchased
commodity accommodating and transporting apparatus 1,
and the commodity weight retrieval section 22 retrieves
10 the weights of the commodities 50 corresponding to the
commodity code information from the commodity
information file 18 in accordance with the commodity
code information of all commodities registered by the
commodity code registration section 17. The total
15 weight calculation section 23 calculates the total
weight of the weights of the commodities 50 retrieved by
the commodity weight retrieval section 22.

The weight comparison section 24 compares the
total weight calculated by the total weight calculation
20 section 23 and the total weight of the commodities 50 in
the accommodation section 3 received by the data
reception section 21, and the alarm generation section
25 generates an alarm when it is determined by the
weight comparison section 24 that the total weight
calculated by the total weight calculation section 23
and the total weight of the commodities 50 in the
accommodation section 3 received by the data reception

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1 section 21 are different from each other.

Each of the purchased commodity accommodating
and transporting apparatus 1 may include a weight
determination section 5 and an alarm generation section
5 6 similar to those shown in FIG. 1 such that the alarm
generation section 6 generates an alarm when it is
determined by the weight determination section 5 that
the total weight of the commodities 50 in the
accommodation section 3 measured by the weighing
10 equipment 4 has changed without reading a commodity code
50a by the commodity code reading section 2.

In the POS system described above with reference
to FIG. 3, the commodity information file 18 for storing
weight information together with price information as
15 commodity information of commodities 50 corresponding to
commodity code information is provided, and upon
settlement of accounts at the settlement POS terminal
19, the total weight of purchased commodities in the
accommodation section 3 of the purchased commodity
20 accommodating and transporting apparatus 1 measured by
the weighing equipment 4 is transmitted from the data
transmission section 20 to the settlement POS terminal
19.

On the other hand, at the settlement POS
25 terminal 19, the weights of the commodities 50 are
retrieved from the commodity information file 18 in
accordance with all commodity code information

1 registered in the commodity code registration section 17
by the commodity weight retrieval section 22, and then
the total weight of the weights of the commodities 50
retrieved by the commodity weight retrieval section 22
5 is calculated by the total weight calculation section
23.

Then, the total weight calculated by the total
weight calculation section 23 and the total weight of
the commodities 50 in the accommodation section 3
10 received at the data reception section 21 are compared
with each other by the weight comparison section 24. If
it is determined that the calculated total weight and
the measured total weight from the purchased commodity
accommodating and transporting apparatus 1 are different
15 from each other, it is determined that the customer has
accommodated a commodity 50 into the accommodation
section 3 without scanning the commodity code 50a or the
customer has placed a different commodity from an
actually scanned commodity into the accommodation
20 section 3 or a plurality of commodities have been placed
into the accommodation section 3 for a single reading
operation or some other unjust act has taken place.
Consequently, an alarm is generated from the alarm
generation section 25.

25 In this instance, similarly as in the purchased
commodity accommodating and transporting apparatus 1
shown in FIG. 1, when it is determined by the weight

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1 determination section 5 that the total weight of the
commodities 50 in the accommodation section 3 from the
weighing equipment 4 has changed without scanning a
commodity code 50a by the commodity code reading section
5 2, an alarm can be generated immediately by the alarm
generation section 6.

With the purchased commodity accommodating and
transporting apparatus having a self scanning function
and the POS system described above with reference to
10 FIG. 3, when it is determined that an actual increment
in weight and the weight corresponding to commodity code
information are different from each other, or when it is
determined that the total weight calculated in
accordance with the commodity code information and the
15 total weight of the commodities actually measured by the
weighing equipment 4 are different from each other, an
error is notified. Consequently, such an intentional
unjust act as to register a single commodity and
accommodate a plurality of commodities at a time into
20 the accommodation section 3 or to accommodate a
commodity 50 into the accommodation section 3 without
registering the same and such an accidental unjust act
as a miss of scanning or an error in scanning can be
detected. Accordingly, those unjust acts can be
25 prevented with certainty. Further, the safety
equivalent to that of a conventional POS system, in
which settlement of accounts is performed by a scanning

1 operation of an operator, can be provided to the store
side which adopts the present POS system, and better
services can be provided to the store side and
customers.

5 Referring now to FIG. 4, there is illustrated a
still further aspect of the present invention. The
aspect illustrated is directed to a purchased commodity
accommodating and transporting apparatus 1 having a self
scanning function. The purchased commodity
10 accommodating and transporting apparatus 1 comprises, in
addition to a commodity code reading section 2, an
accommodating section 3, and a commodity code
registration section 17 similar to those described
hereinabove, a commodity registration determination
15 section 26, and an error notification section 27.

The commodity code reading section 2 is used to
read, upon settlement of accounts, the commodity code
50a of a commodity 50 selected at random from the
commodities accommodated in the accommodation section 3.

20 The commodity registration determination section
26 determines whether or not the commodity code
information read by the commodity code reading section 2
upon settlement of accounts is registered in the
commodity code registration section 17, and the error
25 notification section 27 notifies an error when it is
determined by the commodity registration determination
section 26 upon settlement of accounts that the

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1 commodity code information read by the commodity code
reading section 2 is not registered.

The commodity code registration section 17
automatically registers the commodity code information
5 read by the commodity code reading section 2 when it is
determined upon settlement of accounts by the commodity
registration determination section 26 that the commodity
code information is not registered.

In the purchased accommodating and transporting
10 apparatus 1 having a self scanning function described
above with reference to FIG. 4, upon settlement of
accounts at a settlement POS terminal or the like, the
commodity code 50a of a commodity 50 selected at random
from within commodities accommodated in the
15 accommodation section 3 is read using the commodity code
reading section 2 by an operator.

Then, it is determined by the commodity
registration determination section 26 whether or not the
commodity code information read by the commodity code
20 reading section 2 upon settlement of accounts is
registered in the commodity code registration section
17. When it is determined that the commodity code
information is not registered, it is determined that the
commodity 50 was placed into the accommodation section 3
25 without scanning the commodity code 50a thereof, and an
error is notified by the error notification section 27.
Simultaneously, the commodity code information is

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1 automatically registered into the commodity code
registration section 17.

With the purchased commodity accommodating and
transporting apparatus having a self scanning function,
5 if a commodity 50 which has been accommodated into the
accommodation section 3 without scanning the commodity
code 50a by a customer whether it is intentional or
accidental is detected upon settlement of accounts by
random scanning checking by an operator, then the unjust
10 act can be notified as an error and the commodity 50 can
be automatically registered. Consequently, such an
unjust act as shoplifting by a customer can be prevented
by a restraining effect on a temptation to an unjust act
without imposing a burden on the operator of the
15 settlement POS terminal 19 and without taking such a
countermeasure as to change the color of the commodity
code 50a, and occurrence of unjust acts upon
introduction of a POS system which involves self
scanning can be prevented with certainty.

20 Referring now to FIG. 5, there is illustrated a
yet further aspect of the present invention. The aspect
illustrated is directed to a POS system which includes a
plurality of purchased commodity accommodating and
transporting apparatus 1 (only one is shown in FIG. 5)
25 having a self scanning function, and a settlement POS
terminal 19. Each of the purchased commodity
accommodating and transporting apparatus 1 includes, in

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1 addition to a commodity code reading section 2, an
accommodation section 3, and a commodity code
registration section 17 similar to those described
above.

5 The settlement POS terminal 19 performs final
settlement of accounts for purchased commodities
accommodated in the accommodation section 3 of any of
the purchased commodity accommodating and transporting
apparatus 1 in accordance with the commodity code
10 information registered in the commodity code
registration section 17 of the purchased commodity
accommodating and transporting apparatus 1.

The settlement POS terminal 19 includes a
resonance tag detection section 29, and a commodity
15 number comparison section 30.

The resonance tag detection section 29 detects a
resonance tag 28 applied in advance to each commodity 50
to detect the number of the commodities 50 accommodated
in the accommodation section 3 of any of the purchased
20 commodity accommodating and transporting apparatus 1,
and the commodity number comparison section 30 compares
the number of the commodities 50 detected by the
resonance tag detection section 29 and the number of
registered commodities obtained in accordance with the
25 commodity code information registered by the commodity
code registration section 17.

In the POS system described above with reference

1 to FIG. 5, a resonance tag 28 is applied in advance to
each commodity 50, and upon settlement of accounts at
the settlement POS terminal 19, the resonance tags 28 of
commodities 50 can be detected by the resonance tag
5 detection section 29 of the settlement POS terminal 19
to detect the number of commodities accommodated in the
accommodation section 3 of the purchased commodity
accommodating and transporting apparatus 1.

Then, the number of the actual commodities 50
10 detected by the resonance tag detection section 29 and
the number of registered commodities obtained in
accordance with commodity code information registered in
the commodity code registration section 17 are compared
with each other by the commodity number comparison
15 section 30 of the settlement POS terminal 19. When the
result of the comparison reveals that the numbers are
different from each other, it is determined that the
customer has accommodated a commodity 50 into the
accommodation section 3 without scanning the commodity
20 code 50a of it or the customer has placed a different
commodity from an actually scanned commodity into the
accommodation section 3 or else a plurality of
commodities have been accommodated for a single reading
operation or some other unjust act has been conducted,
25 and this is notified by some means.

Accordingly, with the purchased commodity
accommodating and transporting apparatus having a self

1 scanning function, since the registered number of
commodities and the number of actual commodities
detected by the resonance tag detection section 28 of
the settlement POS terminal 19 are compared with each
5 other and a result of the comparison is notified,
presence or absence of a non-registered commodity can be
confirmed readily at the settlement POS terminal 19 and
notified to the customer. Consequently, occurrence of
unjust acts upon introduction of a POS system which
10 involves self scanning can be prevented with certainty.

Referring finally to FIG. 6, there is
illustrated a yet further aspect of the present
invention. The aspect illustrated is directed to a
purchased commodity accommodating and transporting
15 apparatus 1 having a self scanning function. The
purchased commodity accommodating and transporting
apparatus 1 comprises, in addition to a commodity code
reading section 2 and an accommodating section 3 similar
to those described above, several additional elements
20 denoted at 31 to 41.

In particular, the purchased commodity
accommodating and transporting apparatus 1 comprises a
prepaid card inputting processing section 31 for
receiving a prepaid card and reading remains information
25 of the prepaid card, a commodity price retrieval section
32 for retrieving the price of the commodity 50 in
accordance with the commodity code information read by

1 the commodity code reading section 2, and a data
updating section 33 for registering a result obtained by
subtraction of the price of the commodity 50 retrieved
by the commodity price retrieval section 32 from the
5 remains information read by the prepaid card inputting
processing section 31 as remains information of the
prepaid card to update the remains information.

The purchased commodity accommodating and
transporting apparatus 1 may further comprise a
10 notification section 34 for notifying, when the remains
read by the prepaid card inputting processing section 31
run short of the price of the commodity 50 retrieved by
the commodity price retrieval section 32 and updating by
the data updating section 33 cannot be performed, such
15 shortage, and a selection section 35 for selecting, when
the remains read by the prepaid card inputting
processing section 31 runs short of the price of the
commodity 50 retrieved by the commodity price retrieval
section 32, whether the purchasing processing is to be
20 continued inserting a second prepaid card into the
prepaid card inputting processing section 31 or the
purchasing processing is to be ended.

The purchased commodity accommodating and
transporting apparatus may further comprise a receipt
25 issuance section 36 for issuing a receipt upon
completion of the purchasing, and a receipt issuance
selection section 37 for selecting whether the issuance

1 of a receipt by the receipt issuance section 36 is
necessary or unnecessary.

The purchased commodity accommodating and
transporting apparatus may comprise, in place of or in
5 addition to the prepaid card inputting processing
section 31, the data updating section 33 and the
notification section 34, a magnetic card reading section
38 for receiving a credit card or a bank card and
reading magnetic information of the card, and an
10 automatic clearing processing section 39 for
automatically clearing the amount of money corresponding
to the price of the commodity 50 retrieved by the
commodity price retrieval section 32 from an account
corresponding to the magnetic information of the card.
15 read by the magnetic card reading section 38 some other
day.

The purchased commodity accommodating and
transporting apparatus 1 may further comprise a data
reception section 40 for receiving data from an
20 management section 8, and a power on/off drive section
41 for automatically turning the power source on/off in
response to a power on/off instruction received from the
management section 8 by way of the data reception
section 40.

25 The purchased commodity accommodating and
transporting apparatus may further comprise a weighing
equipment 4, a weight determination section 5, and an

1 alarm generation section 6 such that the alarm
generation section 6 generates an alarm when it is
determined by the weight determination section 5 that
the total weight of the commodities 50 in the
5 accommodation section 3 measured by the weighing
equipment 4 has changed without reading a commodity code
50a by the commodity code reading section 2.

With the purchased commodity accommodating and
transporting apparatus 1 having a self scanning function
10 described above with reference to FIG. 6, final
settlement of accounts, which is conventionally
performed by a settlement POS terminal, can be performed
by self service using a prepaid card, a credit card or a
bank card.

15 In particular, when a prepaid card is used, it
is inserted into the prepaid card inputting processing
section 31 of the purchased commodity accommodating and
transporting apparatus 1. Consequently, remains
information of the prepaid card is read by the prepaid
20 card inputting processing section 31, and the price of
the commodity 50 is retrieved by the commodity price
retrieval section 32 in accordance with commodity code
information read by the commodity code reading section
2.

25 Then, the data updating section 33 registers a
result obtained by subtraction of the retrieved price of
the commodity 50 from the remains information of the

50

1 prepaid card as new remains information of the prepaid
card to update the remains information of the prepaid
card thereby to settle the accounts for the commodity
50.

5 On the other hand, when the remains read by the
prepaid card inputting processing section 31 run short of
the price of the commodity 50 retrieved by the commodity
price retrieval section 32 and consequently the data of
the prepaid card cannot be updated by the data updating
10 section 33, this is notified from the notification
section 34.

When the notification from the notification
section 34 is received, the customer can select, by way
of the selection section 35, whether it inserts a second
15 prepaid card into the prepaid card inputting processing
section 31 to continue its purchasing processing or it
ends the purchasing processing.

Further, a receipt is issued, upon completion of
the purchasing, from the receipt issuance section 36
20 provided in the purchased commodity accommodating and
transporting apparatus 1. In this instance, whether or
not a receipt should be issued from the receipt issuance
section 36 can be switchably selected in accordance with
a demand of the customer by way of the receipt issuance
25 selection section 37.

On the other hand, when a credit card or a bank
card is used, it is inserted into the magnetic card

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1 reading section 38 so that the magnetic information
thereof is read, and the price of the commodity 50 is
retrieved by the commodity price retrieval section 32 in
accordance with commodity code information read by the
5 commodity code reading section 2.

Then, the automatic clearing processing section
39 performs processing to automatically pay the amount
of money corresponding to the retrieved price of the
commodity 50 from an account corresponding to the
10 magnetic information read by the magnetic card reading
section 38 some other day thereby to complete settlement
of the accounts for the commodity 50.

The purchased commodity accommodating and
transporting apparatus 1 can automatically turn the
15 power source on/off by means of the on/off drive section
41 in response to a power on/off instruction from the
upper management section 8 received by way of the data
reception section 40. Consequently, the turning on/off
of the power source of the purchased commodity
20 accommodating and transporting apparatus 1 can be
managed without an artificial operation of a customer,
an operator or some other person.

Further, also with the purchased commodity
accommodating and transporting apparatus 1 in which
25 settlement of accounts is performed by self service
using a card, when it is determined by the weight
determination section 5 that the total weight of

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1 commodities 50 in the accommodation section 3 from the
weighing equipment 4 has changed without scanning a
commodity code 50a by the commodity code reading section
2, an alarm can be generated immediately from the alarm
5 generation section 6 similarly as in the apparatus shown
in FIG. 1.

Thus, with the purchased commodity accommodating
and transporting apparatus having a self scanning
function, since final settlement of accounts can be
10 performed by self service using a prepaid card, a bank
card or a credit card, not only reduction of the burden
on an operator and reduction of the number of operators
can be achieved, but agreeable shopping free from a
waiting time at a settlement POS terminal can be
15 achieved and remarkable reduction of the shopping time
and remarkable enhancement in convenience in a self
shopping form can be realized.

b. First Embodiment

Referring first to FIGS. 7 to 14, there are
20 shown a purchased commodity accommodating and
transporting apparatus and a POS system according to a
first preferred embodiment of the present invention.
Similarly to conventional POS system, the POS system of
the first embodiment actually includes a plurality of
25 purchased commodity accommodating and transporting
apparatus and a single management section and may
include one or more settlement POS terminals. However,

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1 since the purchased commodity accommodating and
transporting apparatus operate independently of one
another and each cooperates with one of the settlement
POS terminals at a time, it is considered that a POS
5 system can be constructed from a single purchased
commodity accommodating and transporting apparatus and a
single settlement POS terminal, and unless otherwise
described, the following description of the POS system
proceeds in regard to a single purchased commodity
10 accommodating and transporting apparatus and a single
settlement POS terminal in order to simplify the
description. This similarly applies to the other
embodiments hereinafter described.

In the embodiments of the present invention
15 including the first embodiment described below, the
present invention is applied to such a scanning cart or
shopping cart 100 as shown in FIGS. 10 and 11 as a
purchased commodity accommodating and transporting
apparatus having a self scanning function. Referring
20 first to FIGS. 10 and 11, the scanning cart 100 includes
a cart section 101 shown in FIG. 10 and a basket member
102 shown in FIG. 11 which serves as an accommodation
section.

The cart section 101 is constructed so as to
25 receive the basket member 102 thereon and includes a
handle section 103 for being grasped by a using person
such as a customer, and four roller members 104 provided

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1 for rotation on the bottom of the cart section 101.
Accordingly, a customer can accommodate commodities to
be purchased into the basket member 102 while freely
moving the cart section 101 on which the basket member
5 102 is placed by grasping and pushing the handle section
103 to rotate the roller members 104.

The cart section 101 further includes, as
hereinafter described in detail with reference also to
FIGS. 7 and 8, a scanner 57 for reading a bar code
10 applied to a commodity as well as a communication
section 53 for communicating data from and to an upper
control section (management section 60 in FIG. 7), a
display section 54 for displaying various information,
and a keyboard section 55 for inputting various
15 information. Further, the purchased commodity
accommodating and transporting apparatus in the present
embodiment includes, though not shown in FIG. 10 but
shown in FIG. 8, a weighing equipment 58 located on the
bottom of the basket member 102 (or the receiving face
20 of the cart section 101 for receiving the basket member
102 thereon) for measuring the total weight of
commodities accommodated in the basket member 102.

In a POS system which employs the scanning cart
100 of the type described above, generally a customer
25 itself reads a bar code applied to each commodity to be
purchased by means of the scanner 57 to read the
commodity code information into the upper control

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1 section (or a storage section 52 in the scanning cart
100 shown in FIG. 7), places or accommodates such
commodities into the basket member 102, depresses, after
selection of commodities to be purchased is completed,
5 an end key (not shown) on the keyboard section 55, and
carries them to a settlement POS terminal (not shown)
with the commodities loaded on the scanning cart 100.

It is to be noted that, upon registration of
commodity code information, a commodity price file (PLU
10 file) in the scanning cart 100 or the upper control
section is retrieved so that information of a commodity
number, a commodity name, a price (unit price) and so
forth of the registered commodity is displayed on the
display section 54 of the scanning cart 100.

15 Then, in the settlement POS terminal, the
commodity code information registered by the customer
itself is loaded down from the upper control section (or
the storage section 52), and in accordance with the
commodity code information, the prices (unit prices) of
20 the commodities corresponding to the commodity codes are
retrieved from the commodity price file (PLU file) and
then a total amount of money of the purchased
commodities is calculated to effect settlement of the
accounts.

25 In order to prevent, in the POS system which
employs the scanning cart 100 of such construction as
described above, such an unjust act of a customer as to

SG

1 accommodate a commodity into the basket member 102
without performing reading of the commodity code by
means of the scanner 57 whether it is intentional or
accidental, in the first embodiment of the present
5 invention, a control system of the scanning cart 100 and
a control section 60 are constructed in such a manner as
shown in FIGS. 7 to 9.

Referring first to FIG. 8, there is shown the
hardware construction of the control system of the
10 scanning cart 100.

The control system includes a CPU (central
processing unit) 51 for controlling the entire control
system of the scanning cart 100, a storage section 52
for storing a program and various data (registered
15 information and so forth including commodity code
information of a scanned commodity), and the
communication section 53 for communicating data with the
management section 60 (or an upper control section such
as a station controller or a store controller) by
20 wireless (infrared rays or the like).

The control system further includes the display
section 54 for displaying various information (commodity
information of a scanned commodity 50, an alarm display
which will be hereinafter described, and so forth), the
25 keyboard section 55 for inputting various information,
and a battery section 56 for supplying power to the
control system of the scanning cart 100.

57

1 The control system further includes the scanner
(bar code reader, commodity code reading section) 57 for
optically reading a bar code (commodity code) 50a
applied to a commodity 50, the weighing section 58 for
5 weighing the total weight of commodities accommodated in
the basket member 102, and a buzzer (alarm sound
generation section, alarm generation section) 59 for
generating sound in response to a control signal from
the CPU 51 (weighing determination section 51a which
10 will be hereinafter described) to generate an alarm.

 Meanwhile, the management section 60 has such a
hardware construction as shown in FIG. 9. In
particular, referring to FIG. 9, the management section
60 includes a CPU 61 for controlling the entire
15 management section 60, a storage section 62 for storing
a program and various data, a communication section 63
for communicating data with the scanning cart 100 by
wireless (infrared rays or the like), a display section
64 for displaying various information, and a keyboard
20 section 65 for inputting various information.

 The POS system in the present embodiment is
functionally constructed in such a manner as shown in
FIG. 7 from the scanning cart 100 and the management
section 60 described above.

25 In particular, referring to FIG. 7, the CPU 51
of the scanning cart 100 has functions as a weight
determination section 51a, an alarm cancellation section

58

1 51b, a timer 51c, a timer determination section 51d and
an error transmission section 51e.

The weight determination section 51a detects the
variation of the total weight of commodities 50 in the
5 basket member 102 weighed by the weighing equipment 58.
When it is determined by the weight determination
section 51a that the total weight of the commodities 50
in the basket member 102 weighed by the weighing
equipment 58 has changed without reading a commodity
10 code 50a by means of the scanner 57, the buzzer 59
generates sound in response to a control signal from the
weight determination section 51a, and for example, such
an alarm display "please scan before placement into the
basket" as shown in FIG. 12 is displayed on the display
15 section 54.

The alarm cancellation section 51b cancels the
sounding operation of the buzzer 59 and the alarm
display of the display section 54 when it is determined
by the weight determination section 51a that the total
20 amount of the commodities in the basket member 102 which
changed without reading a commodity code 50a by means of
the scanner 57 has decreased by such increment after
generation of the alarm.

The timer 51c counts the operation time of the
25 sounding operation of the buzzer 59 and the operation
time of the alarm display of the display section 54.
The timer 51c is activated to start its counting

59

1 operation when a control signal for generation of an
alarm is outputted from the weight determination section
51a. The timer 51c is reset simultaneously when the
alarm is canceled by the alarm cancellation section 51b.

5 The timer determination section 51d determines
whether or not the time counted by the timer 51c has
reached a predetermined time. When it is determined by
the timer determination section 51d that the counted
time by the timer 51c has reached the predetermined
10 time, the error transmission section 51e transmits
unique information (cart number information) of the
scanning cart 100, which is in an alarm generating
condition, as error information to the management
section 60. The error information from the error
15 transmission section 51e is transmitted to the
management section 60 by wireless by way of the
communication section 53.

Meanwhile, in the management section 60, the
communication section 63 has a function as an error
20 reception section 63a which receives the error
information transmitted thereto from the error
transmission section 51e of the scanning cart 100 by way
of the communication section 53.

The display section 64 has a function as an
25 error display section 64a for displaying, when the error
information is received by the error reception section
63a, the cart number which is unique information of the

A handwritten signature or mark consisting of two overlapping loops, resembling a stylized '60' or a cursive signature.

1 scanning cart 100 which has transmitted the error
information. The display of the error display section
64a is provided, for example as shown in FIG. 13, by
lighting a portion (lamp or the like) of the error
5 display section 64a corresponding to the cart number
(one of "1" to "20" in FIG. 13). In FIG. 13, the
display condition when error information has been
received from the cart number "1" is shown, and it is
shown clearly by the mark "*" that the portion
10 indicating the cart number "1" is lit.

The keyboard section 65 has an error cancel key
(error cancellation section) 65a for being depressed
when some measure for the scanning cart 100 from which
the error information has been transmitted (processing
15 against an unjust act) is completed to cancel the
display (lighting) of the cart number of the scanning
cart 100 on the error display section 64a.

In the POS system of the first embodiment of the
present invention having the construction described
20 above, the processing of a procedure illustrated in FIG.
14 is executed for a period of time after a customer
starts use of the scanning cart 100 in order to purchase
commodities 50 until the end key (not shown) on the
keyboard section 55 is depressed to end the purchasing
25 of the commodities 50.

Referring to FIG. 14, if a customer accommodates
a commodity 50 into the basket member 102 of the

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1 scanning cart 100 (step A1), then the weight varied by
the accommodation of the commodity 50 is weighed by the
weighing equipment 58 (step A2).

5 When a weight variation (change of the output of
the weighing equipment 58) is produced in the total
weight of the commodities 50 accommodated in the basket
member 102 of the scanning cart 100, this is detected by
the weight determination section 51a, and then, it is
10 determined whether or not reading (scanning) of the
commodity code 50a by the scanner 57 has been performed
immediately prior to the variation of the weight (step
A3).

If scanning has been performed immediately
prior, the control sequence returns, but on the contrary
15 if it is determined that scanning has not been performed
immediately prior, it is determined that the customer
has accommodated a commodity 50 into the basket member
102 without performing scanning. Thus, the buzzer 59 is
sounded and such an alarm display as shown in FIG. 12 is
20 displayed on the display section 54 (step A4), and
simultaneously the timer 51c is activated to count the
time after generation of the alarm (step A5).

Thereafter, the weight determination section 51a
determines within a predetermined time after the
25 generation of the alarm whether or not the total weight
of the commodities 50 in the basket member 102 weighed
by the weighing equipment 58 has reduced by an amount



1 equal to the increment which has been increased
immediately prior (step A6). If it is detected that the
total weight has decreased by the increment, then it is
determined that the commodity 50 which the customer
5 accommodated into the basket member 102 without scanning
the same has been taken out from within the basket
member 102. Consequently, the alarm cancellation
section 51b immediately cancels the sounding operation
of the buzzer 59 and the alarm display of the display
10 section 54 and simultaneously resets the timer 51c (step
A7).

On the contrary when it is determined by the
timer determination section 51d that the counted time by
the timer 51c reaches the predetermined time, that is,
15 when it is determined that the total weight of the
commodities 50 in the basket member 102 weighed by the
weighing equipment 58 has not decreased by the increment
increased immediately prior even after the predetermined
time has elapsed after the generation of the alarm, the
20 cart number of the scanning cart 100 is transmitted as
error information from the error transmission section
51e to the management section 60 by way of the
communication section 53 (step A8).

In the management section 60 to which the error
25 information has been transmitted, the error information
(cart number) from the scanning cart 100 is received by
the error reception section 63a (step A9), and the cart

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1 number is displayed as shown in FIG. 13 by the error
display section 64a (step A10).

An operator or some other person can grasp, by
referring to the error display section 64a, the scanning
5 cart 100 which has conducted an unjust act (an act of
accommodating a commodity into the basket member 102
without performing scanning) whether it has been
intentional or accidental. Thus, after the operator
completes some countermeasure for the scanning cart 100,
10 it will depress the error cancellation key 65a of the
keyboard section 65 to cancel the error display
(lighting display of the cart number) of the error
display section 64a (step A11).

In this manner, according to the first
15 embodiment of the present invention, when it is
determined by the weight determination section 51a that
the total weight of the commodities 50 in the basket
member 102 from the weighing equipment 58 has increased
without scanning a commodity code 50a, a sounding
20 operation of the buzzer 59 and an alarm display of the
display section 54 can be performed immediately to give
a warning to the customer. Consequently, such an unjust
act that a customer accommodates a commodity 50 into the
basket member 102 missing a scanning operation or
25 accommodates a commodity 50 into the basket member 102
without performing scanning intentionally can be
prevented with certainty.



1 On the other hand, when a customer accommodates
a commodity 50 into the basket member 102 missing a
scanning operation of a commodity code 50a in error, if
a warning by a sounding operation of the buzzer 59 and
5 an alarm display of the display section 54 is given and
the commodity 50 is taken out immediately from the
basket member 102, then the alarming condition is
immediately canceled by the alarm cancellation section
51b. Consequently, a warning of missing of scanning by
10 accident can be given without checking it on a
settlement POS terminal by an operator or a like person
and an unjust act can be prevented with certainty
without giving a disagreeable feeling to the customer.

 Further, in the present embodiment, if a
15 customer ignores such an alarm as described above and
does not take out the commodity 50 for which scanning
has not been performed, then the cart number of the
scanning cart 100 with which such act has been performed
is transmitted as error information to and displayed on
20 the management section 60. Consequently, some
countermeasure can be taken immediately for the scanning
cart 100 with which the unjust act has been performed.

 It is to be noted that, while, in the embodiment
described above, an alarm is generated when the total
25 weight of the commodities 50 has increased without
scanning operation, an alarm may be generated also when
the total weight of the commodities 50 has decreased

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1 without scanning operation. Normally, in order to
cancel purchase of a commodity 50 whose commodity code
50a has been read once, the commodity 50 is taken out
from the basket section 102 and the commodity code 50a
5 of it is scanned, whereafter a cancel key or a like
element is manually operated. When such cancellation
processing is necessitated, if a commodity 50 whose
purchase should be canceled is taken out from the basket
section 102 without scanning the same, then an alarm is
10 generated since the total weight has decreased without
scanning operation as described above. Consequently, it
can be notified to the customer that the customer has
missed cancellation processing.

c. Second Embodiment

15 Referring now to FIGS. 15 to 17, there is shown
a purchased commodity accommodating and transporting
apparatus according to a second embodiment of the
present invention. Also in the present embodiment, the
present invention is applied to the scanning cart 100
20 shown in FIGS. 10 and 11. The purchased commodity
accommodating and transporting apparatus in the present
embodiment is a modification to and includes several
common components to the purchased commodity
accommodating and transporting apparatus in the first
25 embodiment described above, and overlapping description
of such common components is omitted herein to avoid
redundancy. This similarly applies to the remaining

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1 embodiment of the present invention which will be
hereinafter described.

Referring first to FIG. 16, the hardware
construction of the control system of the scanning cart
5 100 in the present embodiment is different from that in
the first embodiment (refer to FIG. 8) in that it
additionally includes a commodity information file 66.

The commodity information file 66 is normally
used as a PLU file and stores commodity information such
10 as commodity numbers, commodity names and prices (unit
prices) corresponding to commodity code information. In
the present embodiment, however, also weight information
of individual commodities 50 corresponding to the
commodity code information is stored as commodity
15 information in the commodity information file 66. It is
to be noted that the weight information of each
commodity 50 need not be held in the commodity
information file 66 as described above, but may
alternatively be provided in the form of a bar code on
20 each commodity 50.

The control system of the scanning cart 100 in
the present embodiment is functionally constructed in
such a manner as shown in FIG. 15.

Referring now to FIG. 15, the CPU 51 of the
25 scanning cart 100 has a function as the weight
determination section 51a similar to that in the first
embodiment and further has functions as a commodity

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1 information retrieval section (commodity weight
retrieval section) 51f, a weight increment calculation
section 51g, a weight comparison section 51h, and a
commodity code registration section 51i.

5 The commodity information retrieval section 51f
retrieves commodity information (a commodity number, a
commodity name, a price (unit price), and a weight) of a
commodity 50 in accordance with commodity code
information obtained by reading the bar code 50a by
10 means of the scanner 57.

The weight increment calculation section 51g
calculates, after the bar code 50a is read by the
scanner 57, the increment in weight increased as the
commodity whose bar code 50a has been read is
15 accommodated into the basket section 102. The weight
increment calculation section 51g includes a buffer 51g-
1 for storing a measured weight value by the weighing
equipment 58 before an increase of the weight, and a
difference calculation section 51g-2 for calculating the
20 difference value between the measured weight value
stored in the buffer 51g-1 and the measured value by the
weighing equipment 58 after the increase of the weight,
that is, the increment in weight.

The weight comparison section 51h compares the
25 weight based on the commodity code of a commodity 50
whose bar code 50a has been read in the present cycle by
the scanner 57 (weight retrieved by the commodity

1 information retrieval section 51f) and the increment in
total weight of commodities 50 in the accommodation
section or basket member 102 after reading of the
commodity code obtained from the weighing equipment 58
5 and the weight increment calculation section 51g.

When it is determined by the weight comparison
section 51h that the retrieved weight by the commodity
information retrieval section 51f and the increment in
total weight calculated by the weight increment
10 calculation section 51g are different from each other, a
sounding operation of the buzzer 59 is performed.

The commodity code registration section 51i
registers or stores commodity code information read from
the bar code 50a of a commodity 50 by the scanner 57 or
15 a result of retrieval retrieved by the commodity
information retrieval section 51f as registered data
into the storage section 52 in the scanning cart 100 by
the commodity code registration section 51i.

It is to be noted that, also in the present
20 embodiment, the weight determination section 51a similar
to that of the first embodiment is provided, and when it
is determined by the weight determination section 51a
that the total weight of commodities 50 in the basket
section 102 measured by the weighing equipment 58 has
25 increased without reading a bar code 50a by the scanner
57, a sounding operation of the buzzer 59 and an
alarming display by the display section 54 are

1 performed.

In the scanning cart 100 of the second embodiment of the present invention having the construction described above, the processing of the procedure
5 illustrated in FIG. 17 is executed for a period of time after a customer begins use of the scanning cart 100 in order to purchase commodities 50 until it depresses the end key (not shown) on the keyboard section 55 to end the purchasing of commodities 50.

10 In particular, if a customer reads the bar code 50a of a commodity 50 to be purchased by means of the scanner 57 (step B1), then the commodity information retrieval section 51f retrieves the weight of the commodity corresponding to the commodity code
15 information from the commodity information file 66.

In this instance, in the present embodiment, also the commodity name and the price (unit price) of the commodity corresponding to the commodity code information are simultaneously retrieved from the
20 commodity information file 66 by the commodity information retrieval section 51f, and the commodity name and the price (unit price) of the retrieved commodity are displayed on the display section 54 (step B2). The thus scanned commodity code information and
25 the data obtained by retrieval are registered or stored as registered data into the storage section 52 by the commodity code registration section 51i (step B3).

1 When the customer accommodates, after the bar
code 50a of the commodity 50 has been scanned, the
commodity 50 into the basket section 102 of the scanning
cart 100 (step B4), the total weight of the commodities
5 in the basket section 102 into which the new commodity
50 has been accommodated is measured by the weighing
equipment 58 (step B5).

 Then, the difference value between the measured
weight value stored in the buffer 51g-1 and the measured
10 weight value by the weighing equipment 58 after the
weight has increased is calculated as an increment in
weight, that is, the weight of the commodity 50 which
has just been accommodated newly into the basket section
102 by hand of the customer by the difference
15 calculation section 51g-2 of the weight increment
calculation section 51g. The increment in weight from
the weight increment calculation section 51g and the
weight corresponding to the commodity code information
retrieved from the commodity information file 66 by the
20 commodity information retrieval section 51f are compared
with each other by the weight comparison section 51h
(step B6).

 If the comparison by the weight comparison
section 16 reveals that the weights are equal to each
25 other (~~actually~~ substantially equal within a
predetermined tolerance), that is, if the determination
at step B7 is NO, the control sequence returns in order

1 to wait for reading of a next bar code 50a.

On the contrary if it is determined at step B7 that the actual increment in weight and the weight corresponding to the commodity code information are
5 different from each other, the buzzer 59 is sounded to notify an error to the customer (step B8). The sounding operation of the buzzer 59 is continued until the actual increment in weight and the weight corresponding to the commodity code information become coincident with each
10 other, thereby to prevent reading or registration of a next commodity code. It is to be noted that the error notification to the customer may be performed not only by the sounding operation of the buzzer 59 but also by an alarm displaying operation of the display section 54.

15 Further, in the present embodiment, similarly as in the first embodiment, while the scanning cart 100 is used in order for a customer to purchase commodities, the total weight of the commodities 50 in the basket section 102 of the scanning cart 100 is normally
20 supervised by the weighing equipment 58 and the weight determination section 51a, and when it is determined that the total weight of the commodities 50 in the basket section 102 from the weighing equipment 58 has increased without scanning a bar code 50a, a warning to
25 the customer is immediately given there by a sounding operation of the buzzer 59 and an alarm display of the display section 54.

1 In this manner, according to the second
embodiment of the present invention, when an intentional
unjust act such as to accommodate a plurality of
commodities at a time into the basket section 102 while
5 scanning (registering) part of the commodities, to
accommodate a commodity having a different weight from
that of a registered commodity into the basket section
102 or to accommodate a commodity into the basket
section 102 without scanning (registering) the same is
10 performed or when an inadvertent (accidental) unjust act
such as a miss of scanning or a scanning error occurs,
the unjust act is detected by checking the total weight
of the commodities 50 in the basket section 102.
Consequently, such unjust acts as described above can be
15 prevented with certainty.

 Accordingly, similar safety to that of a
conventional POS system in which settlement of accounts
is performed by way of a scanning operation of an
operator can be provided to a store side which has
20 adopted the present POS system, and better services can
be provided to the store side and customers.

 It is to be noted that, while the commodity
information file 66 in the embodiment described above is
provided in the control system of the scanning cart 100,
25 the commodity information file may alternatively be
provided in an upper control section, and in this
instance, retrieval of weight information is performed

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1 by way of communications between the commodity
information retrieval section 51f and the upper control
section having the commodity information file by way of
the communication section 53.

5 Further, while, in the embodiment described
above, commodity code information read from the bar code
50a of a commodity 50 by the scanner 57 is registered or
stored into the storage section 52 in the scanning cart
100 by the commodity code registration section 51i, the
10 commodity code information may otherwise be transmitted
to the upper control section by way of the communication
section 53 so that it may be registered or stored into
the storage section in the upper control section.

d. Third Embodiment

15 Referring now to FIGS. 18 to 21, there is shown
a POS system according to a third embodiment of the
present invention. The POS system of the present
embodiment is a modification to the POS system in the
first embodiment described above and similarly employs
20 the scanning cart 100 shown in FIGS. 10 and 11. In the
POS system of the present embodiment, the control system
of the scanning cart 100 and a settlement POS terminal
70 are constructed in such a manner as shown in FIGS. 19
and 20, respectively, in order to prevent an intentional
25 or accidental unjust act.

Referring first to FIG. 18, the hardware
construction of the control system of the scanning cart

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1 100 in the present embodiment is different from that of
the first embodiment (refer to FIG. 8) in that it
additionally includes an optical adapter (data
transmission section) 67.

5 The optical adapter 67 is provided for
communicating, upon final settlement of accounts at the
settlement POS terminal 70, an optical signal with
another optical adapter 79 on the settlement POS
terminal 70 side and transmits the total weight of
10 commodities 50 in the basket section 102 weighed by the
weighing equipment 58 and further transmits commodity
code registered data stored in the storage section 52.

Meanwhile, the settlement POS terminal 70 is
provided for retrieving a commodity information file 81,
15 which will be hereinafter described, in accordance with
commodity code information registered in the commodity
code registration section 51i of the scanning cart 100
to effect final settlement of accounts for the purchased
commodities accommodated in the basket section 102 of
20 the scanning cart 100. The settlement POS terminal 70
in the present embodiment has such hardware construction
as shown in FIG. 20.

In particular, referring to FIG. 20, the
settlement POS terminal 70 includes a CPU 71 for
25 controlling the entire settlement POS terminal 70, a
storage section 72 for storing a program and various
data, a communication section 73 for communicating data

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1 with an upper control section such as a station
controller or a store controller by wireless (infrared
rays or the like), a display section 74 for displaying
various information (a receipt image of a result of
5 settlement of accounts, an alarm display which will be
hereinafter described, and so forth), a keyboard section
75 for inputting various information, and a drawer 76
(drawer section) for accommodating cash therein.

The settlement POS terminal 70 further includes
10 a printer (receipt issuance section) 77 for issuing a
result of settlement of accounts as a receipt, a scanner
(bar code reader) 78 for reading a bar code at the
settlement POS terminal 70 when necessary, and an
optical adapter (data reception section) 79 for
15 communicating an optical signal with the optical adapter
67 on the scanning cart 100 side as described
hereinabove. Commodity total weight data or commodity
code registered data from the scanning cart 100 is
received by the optical adapter 79.

20 The settlement POS terminal 70 further includes
a buzzer (alarm sound generation section, alarm
generation section) 80 for generating sound in response
to a control signal from the CPU 71 to generate an
alarm, and a commodity information file 81 similar to
25 the commodity information file 66 of the second
embodiment. The commodity information file 81 is
normally used as a PLU file and has commodity

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1 information such as commodity numbers, commodity names,
prices (unit prices), weights and so forth corresponding
to commodity code information.

The POS system of the third embodiment is
5 functionally constructed in such a manner as shown in
FIG. 18 from the scanning cart 100 and the settlement
POS terminal 70 described above.

In particular, referring to FIG. 18, the CPU 51
of the scanning cart 100 has functions as the weight
10 determination section 51a and the commodity code
registration section 51i described above and further has
a function as an optical transmission processing section
51j.

The optical transmission processing section 51j
15 performs, upon settlement of accounts at the settlement
POS terminal 70, processing for transmitting the total
weight of the commodities 50 in the basket section 102
measured by the weighing equipment 58 and the commodity
code registered data stored in the storage section 52 to
20 the settlement POS terminal 70 side by the optical
adapter 67.

Meanwhile, the CPU 71 in the settlement POS
terminal 70 has functions as a commodity information
retrieval section (commodity weight retrieval section)
25 71a, a total weight calculation section 71b and a weight
comparison section 71c.

The commodity information retrieval section 71a

1 retrieves commodity information (commodity numbers,
commodity names, prices (unit prices), weights) of all
of the commodities 50 registered at the scanning cart
100 from the commodity information file 81 in accordance
5 with the entire commodity code information (registered
data) transmitted thereto from the scanning cart 100
side by way of the optical adapters 67 and 79.

The total weight calculation section 71b
receives the weight information of all of the
10 commodities 50 registered at the scanning cart 100
retrieved by the commodity information retrieval section
71a and calculates a total weight of the weights of all
of the commodities.

The weight comparison section 71c compares the
15 total weight calculated by the total weight calculation
section 71b and the total weight of the commodities 50
in the basket section 102 received from the scanning
cart 100 side by way of the optical adapter 79.

If it is determined by the weight comparison
20 section 71c that the total weight calculated by the
total weight calculation section 71b and the total
weight of the commodities received from the scanning
cart 100 side are different from each other, the buzzer
80 is sounded and an alarm display is displayed on the
25 display section 74 in response to a control signal from
the weight comparison section 71c.

It is to be noted that, also in the present

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1 embodiment, the weight determination section 51a similar
to that of the first embodiment is provided in the
scanning cart 100, and when it is determined by the
weight determination section 51a that the total weight
5 of the commodities 50 in the basket section 102 measured
by the weighing equipment 58 has increased without
reading a bar code 50a by the scanner 57, a sounding
operation of the buzzer 59 and an alarm display of the
display section 54 are performed.

10 The POS system of the third embodiment of the
present invention having the construction described
above operates in such a manner as illustrated in FIG.
21. Referring to FIG. 21, a customer itself will read
the bar code 50a applied to a commodity to be purchased
15 by means of the scanner 57 to register the commodity
code information into the storage section 52 and load or
accommodate the commodity into the basket section 102
(step C1). Then, it will depress the end key on the
keyboard section 55 to end selection of commodities to
20 be purchased (step C2), place the commodities into the
scanning cart 100 and transport them to the settlement
POS terminal 70.

 Then, upon settlement of accounts at the
settlement POS terminal 70, the commodity code
25 information registered by the customer itself is
transmitted from the storage section 52 of the scanning
cart 100 to the settlement POS terminal 70 side by way

1 of the optical transmission processing section 51j and
the optical adapters 67 and 79, and the commodity
information retrieval section 71a retrieves, in
accordance with the individual commodity code
5 information transmitted thereto, the prices (unit
prices) of the commodities corresponding to the
commodity code information from the commodity
information file 81, calculates the total amount of the
purchased commodities, and performs issuance of a
10 receipt by the printer 77 or the like to effect final
settlement of the accounts.

Upon settlement processing by such settlement
POS terminal 70, in the present embodiment, the total
weight of the commodities in the basket section 102 of
15 the scanning cart 100 is measured by the weighing
equipment 58 (step C3), and the total weight of the
commodities is transmitted to the settlement POS
terminal 70 side by way of the optical transmission
processing section 51j and the optical adapters 67 and
20 79 (step C4).

Meanwhile, at the settlement POS terminal 70,
the weights of the commodities 50 are retrieved from the
commodity information file 81 by the commodity
information retrieval section 71a in accordance with the
25 commodity code information transmitted from the storage
section 52 of the scanning cart 100 to the settlement
POS terminal 70 side by way of the optical transmission

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1 processing section 51j and the optical adapters 67 and
79, and the total weight of the retrieved weights of the
commodities 50 is calculated by the total weight
calculation section 71b (step C5).

5 Then, the total weight calculated by the total
weight calculation section 71b and the total weight data
of the commodities from the scanning cart 100 are
compared with each other by the weight comparison
section 71c (step C6), and when it is determined, as a
10 result of the comparison, that those weights coincide
with each other (actually substantially coincide with
each other within a predetermined tolerance), that is,
when the determination at step C7 is YES, account
settlement processing by the settlement POS terminal 70
15 is ended.

On the contrary when it is determined at step C7
that the weights described above do not coincide with
each other, the buzzer 80 is sounded and an alarm
display is displayed on the display section 74 to notify
20 the error to the customer and an operator of the
settlement POS terminal 70 so as to take some
countermeasure against the unjust act (step C8).

Further, in the present embodiment, similarly as
in the first embodiment, while a customer uses the
25 scanning cart 100 in order to purchase commodities, the
total weight of the commodities 50 in the basket section
102 of the scanning cart 100 is normally monitored by

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1 the weight determination section 51a, and when it is
determined that the total weight of the commodities 50
in the basket section 102 from the weighing equipment 58
has increased without scanning a bar code 50a, a warning
5 to the customer is immediately given there by a sounding
operation of the buzzer 59 and an alarm display of the
display section 54.

In this manner, according to the third
embodiment of the present invention, similar effects to
10 those of the second embodiment are obtained.

It is to be noted that, while the commodity
information file 81 in the embodiment described above is
provided in the settlement POS terminal 70, it may
alternatively be provided in an upper control section.
15 In this instance, retrieval of weight information is
performed by communications between the commodity
information retrieval section 71a and the upper control
section which has the commodity information file 81 by
way of a communication section 83.

20 Further, while, in the embodiment described
above, commodity code information read from the bar code
50a of a commodity 50 by the scanner 57 is registered or
stored into the storage section 52 in the scanning cart
100 by the commodity code registration section 51i, the
25 commodity code information may alternatively be
transmitted to the upper control section by way of the
communication section 53 so that it may be registered or

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1 stored into a storage section of the upper control
section.

In this instance, upon settlement of the
accounts at the settlement POS terminal 70, the
5 commodity code information registered by the scanning
cart 100 is transmitted from the upper control section
to the commodity information retrieval section 71a by
way of the communication section 73. In this instance,
also total weight information of the commodities upon
10 settlement of the accounts from the weighing equipment
58 may additionally be transmitted to the settlement POS
terminal 70 side by way of the communication section 53,
the upper control section and the communication section
73, and where such data transmission is performed, the
15 optical adapters 67 and 79 may be omitted.

e. Fourth Embodiment

Referring now to FIG. 22, there is shown a
purchased commodity accommodating and transporting
apparatus according to a fourth embodiment of the
20 present invention. The purchased commodity
accommodating and transporting apparatus of the present
embodiment is a modification to that in the first
embodiment described above and similarly employs the
scanning cart 100 shown in FIGS. 10 and 11.

25 While the hardware construction of the control
system of the scanning cart 100 in the fourth embodiment
is substantially similar to that of the first embodiment

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1 (refer to FIG. 8), in the present embodiment, the
weighing instrument 58 for measuring the total weight of
commodities 50 in the basket section 102 is omitted.
Meanwhile, the scanner 57 in the present embodiment is
5 used to read, upon random scan checking (which will be
hereinafter described) which is performed by an operator
upon settlement of accounts, the bar code 50a of a
commodity 50 selected at random from the commodities
accommodated in the basket section 102.

10 The control system of the scanning cart 100 in
the present embodiment is functionally constructed in
such a manner as illustrated in FIG. 22.

In particular, referring to FIG. 22, the CPU 51
of the scanning cart 100 has functions as a main control
15 section 51k, a commodity registration control section
51m, a random scan control section (commodity
registration determination section) 51n, a commodity
code reading control section 51p, a commodity
information display control section (commodity price
20 retrieval section) 51q, a commodity code registration
section 51r, and an error notification section 51s.

The main control section 51k controls the CPU 51
and effects, for example, input control (input control
upon starting of use of the scanning cart 100
25 (depression of the start key), upon ending of purchasing
(depression of the end key), upon ending of random scan
checking and so forth) of various data from the keyboard

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1 section 55, accessing to the commodity registration
control section 51m during shopping, accessing to the
random scan control section 51n upon starting of random
scan checking, and some other necessary control.

5 The commodity code reading control section 51p
is provided to control reading of a bar code 50a by the
scanner 57 and controls inputting of commodity code
information obtained by reading the bar code 50a by the
scanner 57 to the CPU 51.

10 The commodity registration control section 51m
is accessed from and activated by the main control
section 51k upon inputting of starting of use from the
keyboard section 55 by a customer. The commodity
registration control section 51m reads in, during
15 shopping of the customer, commodity code information
from the scanner 57 by the commodity code reading
control section 51p and registers or stores (saves) the
commodity code information into the storage section
(commodity code registering memory) 52 using the
20 commodity code registration section 51r.

The commodity information display control
section (commodity price retrieval section) 51q is
activated together with the commodity registration
control section 51m and, simultaneously when commodity
25 code information read in by the scanner 57 and the
commodity code reading control section 51p is
registered, performs, based on the commodity code

A handwritten signature or mark, possibly the letters 'ES' or a stylized 'S', located at the bottom center of the page.

1 information thus read in, retrieval of commodity
information such as the price of the commodity from the
commodity information file (not shown in FIG. 22)
described hereinabove, whereafter it controls the
5 display section 54 to display a result of the retrieval
(the commodity name and the price (unit price)), the
purchased quantity and the total amount of money
thereon.

It is to be noted that the commodity information
10 file may be provided in the control system of the
scanning cart 100 or alternatively may be provided in
the upper control section such as a station controller.
However, where the commodity information file is
provided in the upper control section, retrieval of
15 commodity information such as a price is performed by
way of communications between the commodity information
display control section 51q and the upper control
section having the commodity information file by way of
the communication section 53.

20 The random scan control section (commodity
registration determination section) 51n is accessed from
and activated by the main control section 51k when a
customer depresses the end key of the keyboard section
55 in order to end its shopping, and has a function of
25 determining whether or not commodity code information
read in from the commodity code reading control section
51p upon a random scan checking operation (an operation

86

1 of scanning the bar code 50a of a commodity 50 selected
at random from within the basket section 102 by means of
the scanner 57) by an operator of a settlement POS
terminal has been registered into the storage section 52
5 by the commodity code registration section 51r.

The error notification section 51s is activated
when it is determined by the random scan control section
51n that commodity code information read in upon a
random scan checking operation has not been registered,
10 and causes the buzzer 59 to perform a sounding operation
and causes the display section 54 to display an error
message to notify the error to the customer or the
operator.

Further, in the present embodiment, when it is
15 determined by the random scan control section 51n that
commodity code information read in upon a random scan
checking operation has not been registered, the
commodity code information of the commodity which has
not been registered is automatically registered into the
20 storage section 52 using the commodity registration
control section 51m and the commodity code registration
section 51r.

In the scanning cart 100 in the fourth
embodiment of the present invention having the
25 construction described above, when a customer starts
shopping using the scanning cart 100, the start key of
the keyboard section 55 will first be depressed to

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1 perform inputting of starting of use, whereupon the
commodity registration control section 51m is started by
the main control section 51k.

For a period of time until inputting of ending
5 of use is performed from the keyboard section 55 after
starting of use, the customer scans the bar code 50a of
a commodity 50 to be purchased by means of the scanner
57 so that commodity code information is read in from
the scanner 57 by means of the commodity code reading
10 control section 51p (step D1), and then accommodates the
commodity into the basket section 102.

Then, after the commodity code information is
read in, the commodity code information is registered or
stored into the storage section 52 using the commodity
15 code registration section 51r by the commodity
registration control section 51m (step D2).

Meanwhile, in accordance with the commodity code
information, commodity information such as the price of
the commodity is retrieved from the commodity
20 information file by the commodity information display
control section 51q (step D3), and a result (commodity
name, price (unit price)) of the retrieval, the amount
to be purchased and the total amount of money are
displayed on the display section 54 (step D4).

25 The processes at the steps D1 to D4 are repeated
until the customer depresses the end key of the keyboard
section 55 to effect inputting of ending of use (step

88

1 D5).

When the customer depresses the end key of the keyboard section 55 to end its shopping, the random scan control section 5ln is activated by the main control section 5lk so that a random scan checking condition is entered. The activated condition of the random scan control section 5ln is continued until inputting of ending the random scan checking is performed from the keyboard section 55 (step D6).

10 At the settlement POS terminal, upon settlement of the accounts, random scan checking is performed for a commodity in the basket section 102 of the scanning cart 100 by the operator. In particular, the operator of the settlement POS terminal selects a commodity 50 at random from within the basket section 102 and scans the bar code 50a of the commodity 50 by means of the scanner 57 to read in commodity code information from the scanner 57 by the commodity code reading control section 5lp (step D7).

20 Thereafter, it is determined by the random scan control section 5ln whether or not the commodity code information read in at random in such a manner as described above is registered in the storage section 52 (step D8). When it is determined that the commodity code information is registered, the control sequence returns to step D6, but when it is determined that the commodity code information is not registered as yet, the

25

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1 error notification section 51s is activated so that
sounding of the buzzer 59 and error message display of
the display section 54 are performed by the error
notification section 51s so that the error that the
5 commodity has not been registered is notified to the
customer or the operator (step D9).

Then, the commodity code information which has
been determined that it has not been registered is
automatically registered or stored into the storage
10 section 52 using the commodity registration control
section 51m and the commodity code registration section
51r in a similar manner as at steps D2 to D4 described
above (step D10), and in accordance with the commodity
code information, commodity information such as the
15 price of the commodity is retrieved from the commodity
informations file by the commodity information display
control section 51q (step D11). Then, a result of the
retrieval (the commodity name and the price (unit
price)) and so forth are displayed on the display
20 section 54 (step d12).

In this manner, according to the fourth
embodiment of the present invention, upon settlement of
the accounts at the settlement POS terminal or the like,
random scan checking can be performed by the operator
25 using the scanner 57, and if there is a commodity which
has been accommodated into the basket section 102
without performing scanning whether it is intentional or

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1 accidental, then the unjust act can be notified as an
error and the commodity can be automatically registered.

Accordingly, an unjust act by a customer such as
shoplifting can be prevented without imposing a burden
5 on an operator of a settlement POS terminal and without
taking such a countermeasure as to change the color of
the bar code 50a, and occurrence of an unjust act upon
introduction of a POS system which involves self
scanning can be prevented with certainty.

10 f. Fifth Embodiment

Referring now to FIGS. 24 to 27, there is shown
a POS system according to a fifth embodiment of the
present invention. The POS system of the present
embodiment is a modification to the POS system in the
15 first embodiment described above and similarly employs
the scanning cart 100 shown in FIGS. 10 and 11.

In the present fifth embodiment, in order to
prevent an intentional or accidental unjust act in the
POS system which employs such scanning cart 100 as shown
20 in FIGS. 10 and 11, the control system of the scanning
cart 100, the settlement POS terminal 70 and a
controller (upper control section) 90 are constructed in
such a manner as shown in FIGS. 24 to 26.

While the hardware construction of the control
25 system of the scanning cart 100 in the present
embodiment is substantially similar to that of the first
embodiment (refer to FIG. 8), in the present embodiment,

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1 the measuring instrument reference numeral 58 for
measuring the total weight of the commodities 50 in the
basket section 102 and the buzzer 59 may be omitted.

Meanwhile, the settlement POS terminal 70 in the
5 present embodiment performs final settlement of accounts
for purchased commodities accommodated in the basket
section 102 of the scanning cart 100 in accordance with
a detailed log (produced in accordance with commodity
code information registered from the scanning cart 100)
10 from a detailed log file (which will be hereinafter
described) of the controller 90, and the hardware
construction of the settlement POS terminal 70 is
substantially similar to that of the third embodiment
(refer to FIG. 20). However, in the present embodiment,
15 the optical adapter 79 and the buzzer 80 are omitted
while a resonance tag detection section 82 is
additionally provided as shown in FIG. 25.

The resonance tag detection section 82 detects a
resonance tag 28 applied in advance to each commodity 50
20 together with a bar code 50a to detect the number of
commodities 50 accommodated in the basket member 102 of
the scanning cart 100, and is constructed including an
antenna section provided on the opposite sides of a
passage of the scanning cart 100 to a settlement
25 position at the settlement POS terminal 70.

The resonance tag 28 is constructed as a label
which has a built-in resonance circuit therein.

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1 Where resonance tags having resonance
frequencies all different from one another are used for
as such resonance tag 28, when the scanning cart 100
passes the antenna section of the resonance tag
5 detection section 82, the frequency of radio waves of
the antenna section is varied so as to transmit radio
waves of frequencies with which resonance tags 28
resonate, thereby to establish resonance with all of the
resonance tags 28. In this instance, the number of the
10 resonance tags 28, that is, the number of the
commodities 50 in the basket section 102, can be
detected from the number of resonance reactions returned
from the resonance tags 28.

On the other hand, where resonance tags having
15 an equal frequency are used for the resonance tag 28 for
all commodities 50, when the scanning cart 100 passes
the antenna section of the resonance tag detection
section 82, radio waves of the frequency with which the
resonance tags 28 resonate are transmitted from the
20 antenna section so that they may resonate with all of
the resonance tag 28. In this instance, the number of
the resonance tags 28, that is, the number of the
commodities 50 in the basket section 102, can be
detected from the magnitude (total magnitude) of the
25 resonance reactions.

The controller 90 is an upper control section
(for example, a station controller) for controlling the

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1 scanning cart 100 and the settlement POS terminal 70.
The hardware construction of the controller 90 of the
fifth embodiment is such as shown in FIG. 26.

In particular, referring to FIG. 26, the
5 controller 90 includes a CPU 91 for controlling the
entire controller 90, a storage section 92 for storing a
program and various data, a communication section 93 for
communicating data with the scanning cart 100 or the
settlement POS terminal 70 by wireless (infrared rays
10 and so forth), and a display section 94 for displaying
various information (a screen edited by the CPU 91 as
hereinafter described and so forth). The controller 90
further includes a commodity information file 95 used as
a PLU file, in which commodity numbers, commodity names,
15 prices (unit prices) and so forth corresponding to
commodity code information are stored. The controller
90 further includes a detailed log file 96 for storing a
detailed log produced in accordance with commodity code
information registered from the scanning cart 100.

20 The POS system of the fifth embodiment is
functionally constructed as illustrated in FIG. 24 from
the scanning cart 100, the settlement POS terminal 70
and the controller 90 described above.

In particular, referring to FIG. 24, the CPU 51
25 of the scanning cart 100 has functions as an input
control section 51t, an inquiring processing control
section 51u, a screen data reception control section

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1 51v, and a display control section 51w.

The input control section 51t executes input control for reading key input data from the keyboard section 55 and commodity code information read by the scanner 57 into the CPU 51.

The inquiring processing control section (commodity code registration section) 51u has a function of producing an inquiring telegraph having commodity code information of a commodity 50 read by the scanner 57 and transmitting the inquiring telegram to the controller 90 by way of the communication section 53 to register the commodity code information, and has another function of demanding screen data produced on the controller 90 side in accordance with the commodity code information as hereinafter described.

The screen data reception control section 51v receives screen data transmitted thereto from the controller 90 side by way of the communication section 53 in response to an inquiring telegraph transmitted from the inquiring processing control section 51u to the controller 90. The display control section 51w controls the display section 54 to display the screen data from the screen data reception control section 51v thereon.

The CPU 71 of the settlement POS terminal 70 has functions as an input control section 71d, a transmission demanding section 71e, a data reception control section 71f, a commodity number comparison



1 section 71g, and a POS-I/O control section 71h.

The input control section 71d performs input control for reading key input data from the keyboard section 75 (for example, cart number data of a scanning
5 cart 100 which makes an object for settlement of accounts at a settlement POS terminal 70) into the CPU 71. The transmission demanding section 71e demands, upon settlement of accounts, the controller 90 for transmission of a detailed log (detailed data) of a cart
10 number from the input control section 71d.

The data reception control section 71f controls the communication section 53 to receive a detailed log transmitted thereto from the controller 90 side in response to a detailed log transmission demand from the
15 transmission demanding section 71e.

The commodity number comparison section 71g compares the number of the commodities 50 detected by the resonance tag detection section 82 and the number of registered commodities obtained by referring to detailed
20 logs received by the data reception control section 71f.

The POS-I/O control section 71h controls a printing operation of a journal/receipt by the printer 77, delivery of money by opening and closing operations of the drawer 76 and a reading operation by the scanner
25 78.

The CPU 91 of the controller 90 has functions as a communication control section 91a, a commodity price

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1 retrieval section 91b, a calculation processing section
91c, a screen data edition section 91d, a file control
section 91e, and a detailed log file transmission
control section 91f.

5 The communication control section 91a controls
communications of data (an inquiring telegram, screen
data to be displayed on the display section 54, and so
forth) with the scanning cart 100 and the settlement POS
terminal 70 by way of the communication section 93. The
10 commodity price retrieval section 91b retrieves, in
accordance with commodity code information of a
commodity 50 read by the scanner 57 and transmitted
thereto from the scanning cart 100 side, the commodity
name, the price (unit price) and so forth of the
15 commodity 50 from the commodity information file 95.

The calculation processing section 91c sums
prices obtained by retrieving the commodity information
file 95 in accordance with commodity code information
from the scanning cart 100 by means of the commodity
20 price retrieval section 91b to calculates the total
amount of money of the purchased commodities 50
accommodated in the basket section 102 of the scanning
cart 100.

The screen data edition section 91d produces,
25 each time an inquiring telegram from a scanning cart 100
is received, new screen data in which the price of a
commodity obtained in accordance with newly registered

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1 commodity code information is involved.

By the screen data edition section 91d, image data are produced in such a receipt image (receipt printed by the printer 77 of the settlement POS terminal 5 70) as shown, for example, in FIG. 27 wherein commodity information such as the price, the commodity name, the commodity number and so forth obtained by retrieval of the commodity price retrieval section 91b and a total amount of money calculated by the calculation processing 10 section 91c are displayed. The screen data produced in response to the inquiring telegram from the scanning cart 100 in this manner are transmitted to the scanning cart 100 by way of the communication control section 91a and the communication section 93.

15 The file control section 91e makes a detailed log from a result of retrieval by the commodity price retrieval section 91b in accordance with commodity data information and so forth and controls storage of the detailed log into the detailed log file 96 in response 20 to the cart number of the scanning cart 100. The file control section 91e also has a function of counting up, each time new commodity code information (inquiring telegram) is transmitted thereto, the number of such transmissions to count the number of scanned commodities 25 and storing the counted number of commodities as information into the detailed log.

The detailed log file transmission control



1 section 91f reads out, upon reception of a detailed log
transmission demand from the transmission demanding
section 71e of the settlement POS terminal 70, a
detailed log corresponding to cart number information
5 included in the detailed log transmission demand from
the detailed log file 96 and controls transmission of
the detailed log to the settlement POS terminal 70 by
way of the communication section 93.

In the POS system of the fifth embodiment of the
10 present invention having the construction described
above, a customer reads the bar code 50a applied to a
commodity to be purchased by means of the scanner 57 and
inputs commodity code information of the bar code 50a
(step E1), and then places and accommodates the
15 commodity into the basket section 102.

In the CPU 51 of the scanning cart 100, each
time commodity code information is read by the scanner
57, an inquiring telegram having the commodity code
information is produced by the inquiring processing
20 control section 51u and transmitted to the controller 90
by way of the communication section 53 (step E2).
Consequently, the commodity code information read by the
scanner 57 is registered on the controller 90 side.

In the meantime, in the CPU 91 of the controller
25 90 having received the inquiring telegram by way of the
communication section 93, the inquiring telegram is
inputted by the communication control section 91a, and

1 the commodity information file 95 is retrieved (PLU) by
the commodity price retrieval section 91b in accordance
with the commodity code information included in the
inquiring telegram so that commodity information such as
5 the commodity number, the commodity name, the price
(unit price) and so forth of the commodity 50
corresponding to the commodity code information is
obtained (step E3).

In this instance, a result of the retrieval by
10 the commodity price retrieval section 91b in accordance
with the commodity code information is stored as a
detailed log into the detailed log file 96 in accordance
with the cart number of the scanning cart 100, which has
transmitted the inquiring telegram, by the file control
15 section 91e. Upon such storage control, also the number
of commodities in the scanning cart 100 counted up each
time new commodity code information (inquiring telegram)
is transmitted thereto is written into the detailed log
by the file control section 91e (step E4).

20 Then, in the CPU 91, the prices retrieved by the
commodity price retrieval section 91b are summed by the
calculation processing section 91c to calculate the
total amount of money of the purchased commodities 50
accommodated in the basket section 102 of the scanning
25 cart 100.

Thereafter, screen data of such a receipt image
as shown in FIG. 27 is produced by the screen data

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1 edition section 91d in accordance with commodity
information such as the price, the commodity name, the
commodity number and so forth retrieved for new
commodity code information each time an inquiring
5 telegram is received from the scanning cart 100 and the
total amount of money calculated by the calculation
processing section 91c (step E5).

 The screen data produced in this manner are
transmitted to the scanning cart 100 by way of the
10 communication control section 91a and the communication
section 93 (step E6). On the scanning cart 100 side,
the screen data are received by the screen data
reception control section 51v by way of the
communication section 53 and displayed on the display
15 section 54 by the display control section 51w (step E7).

 The processes at the steps E1 to E7 are repeated
until after the customer depresses the end key of the
keyboard section 55 to effect inputting of ending of use
(step E8).

20 The customer depresses the end key of the
keyboard section 55 (or an "end" key displayed as a
touch sensor on the screen of the display section 54 as
shown in FIG. 27) to end its shopping, places the
commodities into the scanning cart 100 and moves to the
25 settlement POS terminal 70 (step E9).

 At the settlement POS terminal 70, cart number
data of the scanning cart 100 as an object for

1 settlement of accounts are inputted from the keyboard
section 75 by an operator (step E10). The inputted cart
number data are inputted from the input control section
71d to the CPU 71, and the cart number is transmitted to
5 the controller 90 side by way of the communication
section 73 by the transmission demanding section 71e
(step E11). Then the transmission demanding section 71e
demands the controller 90 for transmission of a detailed
log (detailed data) of the cart number.

10 Meanwhile, on the settlement POS terminal 70
side, each time a scanning cart 100 passes the antenna
section of the resonance tag detection section 82 and
comes to the settlement position, the resonance tags 28
in the scanning cart 100 are detected by the resonance
15 tag detection section 82 (step E12), and the number of
the commodities 50 in the basket section 102 is
acknowledged (step E13).

On the other hand, on the controller 90 side,
when the detailed log transmission demand from the
20 transmission demanding section 71e of the settlement POS
terminal 70 is received, a detailed log corresponding to
the cart number information included in the detailed log
transmission demand is retrieved and read out from the
detailed log file 96 (step E14) and transmitted to the
25 settlement POS terminal 70 by way of the communication
section 93 by the detailed log file transmission control
section 91f (step E15).

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1 Then, on the settlement POS terminal 70 side,
when the detailed log from the controller 90 side is
received by the data reception control section 71f by
way of the communication section 53 (step E16), the
5 number of the commodities 50 acknowledged at step E13 by
the resonance tag detection section 82 and the number of
registered commodities stored in the detailed log
received by the data reception control section 71f are
compared with each other by the commodity number
10 comparison section 71g (step E17).

When the acknowledged commodity number and the
registered commodity number coincide with each other as
a result of the comparison by the commodity number
comparison section 71g, that is, when the determination
15 at step E17 is YES, a receipt is outputted from the
printer 77 in accordance with the detailed log from the
controller 90 (step E18), and delivery of cash is
performed, thereby ending the settlement of the accounts
(step E21).

20 On the contrary when the acknowledged commodity
number and the registered commodity number are different
from each other as a result of the comparison by the
commodity number comparison section 71g, that is, when
the determination at step E17 is NO, this is displayed
25 on the display section 74, and the operator notifies to
the customer that there is a miss in registration of a
commodity (step E19) and performs registration of the

1 commodity (step E20), whereafter a receipt is outputted
from the printer 77 (step E18) and delivery of cash is
performed, thereby ending the settlement processing of
the accounts (step E21).

5 In this manner, according to the fifth
embodiment of the present invention, since the number of
data (number of registered commodities) registered for
commodity registration on a scanning cart 100 is held in
the detailed log file 96 of the controller 90 and the
10 data number and the number of acknowledged commodities
detected by the resonance tag detection section 82 of
the settlement POS terminal 70 are compared with each
other and then a result of the comparison is notified,
an operator of the settlement POS terminal 70 can
15 confirm presence or absence of a non-registered
commodity readily and can notify such presence or
absence to the customer.

Accordingly, similarly as in the fourth
embodiment, an unjust act by a customer such as
20 shoplifting can be prevented without imposing a burden
on an operator of a settlement POS terminal and without
taking such a countermeasure as to change the color of
the bar code 50a, and an restraining effect against a
temptation to an unjust act can be anticipated.
25 Consequently, occurrence of an unjust act upon
introduction of a POS system which involves self
scanning can be prevented with certainty.

1 It is to be noted that, while the commodity
information file 95 in the embodiment described above is
provided in the controller 90, the commodity information
file may otherwise be provided in a scanning cart 100 or
5 a settlement POS terminal 70. Where the commodity
information file is provided in a scanning cart 100, a
display screen for the display section 54 of the
scanning cart 100 is produced on the scanning cart 100
side.

10 Further, while, in the embodiment described
above, commodity code information read from the bar code
50a of a commodity 50 by the scanner 57 is transmitted
to the controller 90 side and registered or stored as a
detailed log into the detailed log file 96, the
15 commodity code information may alternatively be
registered or stored into the storage section 52 of the
scanning cart 100 side.

 In this instance, upon settlement of accounts at
the settlement POS terminal 70, the commodity code
20 information registered in the storage section 52 of the
scanning cart 100 is transmitted to the settlement POS
terminal 70 side by way of such an optical adapter as
shown in FIG. 18 or by way of the controller 90.

g. Sixth Embodiment

25 Referring now to FIGS. 29 to 33, there is shown
a purchased commodity accommodating and transporting
apparatus according to a sixth embodiment of the present

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1 invention. The purchased commodity accommodating and
transporting apparatus of the present embodiment is a
modification to that in the first embodiment described
above and similarly employs the scanning cart 100 shown
5 in FIGS. 10 and 11.

While the hardware construction of the control
system of the scanning cart 100 in the sixth embodiment
is substantially similar to that of the first embodiment
(refer to FIG. 8), the control system in the present
10 embodiment additionally includes, as shown in FIG. 30, a
communication section 83, a printer (receipt issuance
section) 84 (FIG. 29), a sensor 85, and a commodity
information file 86.

The communication section 83 updates, when a
15 prepaid card 87 is inserted into it and remains
information of the prepaid card 87 is read and then
purchasing and settlement of accounts based on the
prepaid card 87 is performed, the remains information of
the prepaid card 87 and then discharges the prepaid card
20 87 as hereinafter described in detail with reference to
FIG. 29.

The printer 84 performs a printing operation in
order to issue a receipt on the scanning cart 100. The
sensor 85 is provided in the proximity of an upper
25 opening of the basket section 102 as shown in FIG. 31
for optically detecting accommodation of a commodity 50
into the basket section 102 (particularly an unjust act

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1 of accommodation without scanning). The commodity
information file 86 is an ordinary PLU file and stores
commodity information such as the commodity numbers, the
commodity names, the prices (unit prices) and so forth
5 corresponding to commodity code information.

The control system of the scanning cart 100 in
the present embodiment is functionally constructed in
such a manner as shown in FIG. 29.

In particular, referring to FIG. 29, the CPU 51
10 of the scanning cart 100 has functions as the weight
determination section 51a similar to that of the first
embodiment and the commodity information retrieval
section (commodity weight retrieval section) 51f and the
commodity code registration section 51i similar to those
15 of the second embodiment and further has functions as a
main control section 51A and a notification section 51B.

The main control section 51A controls the CPU 51
and receives data inputted thereto from the upper
control section by way of the communication section 53,
20 key input data (input data from the end key, a purchase
continuing key, a receipt issuance key and so forth)
from the keyboard section 55, a detection signal from
the sensor 85 and so forth to perform various functions
(a display controlling function for the display section
25 54, a print controlling function for the printer 84, a
function as a power on/off driving section and so forth)
as hereinafter described.

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1 The notification section 51B notifies, when data
of a prepaid card 87 cannot be updated by the
communication section 83b of the communication section
83, this to the main control section 51A and causes the
5 display section 54 to display this as hereinafter
described.

 The communication section 83 is constituted from
a communication section 83a, a communication section 83b
and a communication section 83c.

10 The communication section 83a reads remains
information of a prepaid card 87 inserted therein. The
communication section 83b subtracts the price of a
commodity 50 detected by the commodity information
retrieval section 51f from remains information read by
15 the communication section 83a, and registers a result of
the subtraction as remains information of the prepaid
card 87 to update the prepaid card 87.

 The communication section 83c discharges a
prepaid card 87 whose data have been updated by the
20 communication section 83b.

 In this instance, in the present embodiment,
when the remains read by the prepaid card inputting
processing section 31 are smaller than the price of a
commodity 50 retrieved by the commodity information
25 retrieval section 51f and consequently the data of the
prepaid card 87 cannot be updated by the communication
section 83b, the notification section 51B is activated

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1 in response to a signal from the communication section
83b so that this is notified to the main control section
51A and displayed on the display section 54.

Further, in the present embodiment, when it is
5 displayed on the display section 54 based on the
notification from the notification section 51B that the
remains are short, the customer who refers to the
display section 54 can select whether it depresses the
purchase continuing key (not shown) of the keyboard
10 section 55 and inserts a second prepaid card 87 into the
communication section 83 (communication section 83a) to
continue its purchasing processing or it depresses the
end key (not shown) of the keyboard section 55 to end
the purchasing processing (function as selection
15 section).

Further, in the present embodiment, the receipt
issuance key (not shown, receipt issuance selection
section) is provided on the keyboard section 55, and a
customer can select whether issuance of a receipt by the
20 printer (receipt issuance section) 84 is necessary or
unnecessary depending upon whether or not the customer
depresses the receipt issuance key upon ending of the
purchase.

It is to be noted that the main control section
25 51A in the present embodiment has a function as a power
on/off driving section which automatically turns the
power source (56) of the scanning cart 100 on or off in

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1 response to a power on/off instruction when the
instruction is received from the upper management
section (not shown) such as a station controller by way
of the communication section (data reception section)

5 53.

Further, also in the present embodiment, the
weight determination section 51a similar to that of the
first embodiment is provided in the scanning cart 100,
and when it is determined by the weight determination
10 section 51a that the total weight of the commodities 50
in the basket section 102 measured by the weighing
equipment 58 has increased without reading a bar code
50a by means of the scanner 57, a sounding operation of
the buzzer 59 and an alarm display of the display
15 section 54 are performed.

Simultaneously with this, the main control
section 51A in the present embodiment has a function of
causing a sounding operation of the buzzer 59 and an
alarm display of the display section 54 to be performed
20 also when a detection signal from the sensor 85 is
received to detect an accommodation operation of a
commodity 50 into the basket section 102 without reading
a bar code 50a by means of the scanner 57.

The scanning cart 100 of the sixth embodiment of
25 the present invention having the construction described
above operates in such a manner as illustrated in FIG.
32. Referring to FIG. 32, when a customer does not have

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1 a prepaid card 87 (step F1), it will purchase a prepaid
card 87 at a prepaid card issuance machine (not shown)
(step F2) and insert the prepaid card 87 into the
communication section 83 of the scanning cart 100 (step
5 F3). At a point of time when the prepaid card 87 is
inserted into the communication section 83 in this
manner, remains information of the prepaid card 87 is
read by the communication section 83a and displayed on
the display section 54 (step F4).

10 Then, the customer reads the bar code 50a
applied to a commodity 50 to be purchased by means of
the scanner 57 to register commodity code information of
the bar code 50a into the storage section 52 and places
or stores the commodity into the basket section 102
15 (step F5).

It is to be noted that, in the present
embodiment, while a customer uses the scanning cart 100
in order to purchase commodities, the total weight of
the commodities 50 in the basket section 102 of the
20 scanning cart 100 is normally monitored by the weighing
equipment 58 and the weight determination section 51a
and unjust accommodation of a commodity 50 is monitored
by the sensor 85, and when it is determined that the
total weight of the commodities 50 in the basket section
25 102 from the weighing equipment 58 has increased without
scanning a bar code 50a or when an accommodation
operation of a commodity 50 into the basket section 102



1 is detected by the sensor 85, a warning to the customer
(checking of an unjust act) is immediately given there
by a sounding operation of the buzzer 59 and an alarm
display of the display section 54 (step F6).

5 Then, when the customer reads the bar code 50a
of a commodity 50 to be purchased by means of the
scanner 57, commodity information such as the commodity
number, the commodity name, the price (unit price) and
so forth of the commodity corresponding to the commodity
10 code information is retrieved from the commodity
information file 66 by the commodity information
retrieval section 51f, and the thus retrieved commodity
information is displayed on the display section 54 (step
F7).

15 Thereafter, the communication section 83b of the
communication section 83 registers a result of
subtraction of the retrieved price of the commodity 50
from the remains information of the prepaid card 87 as
new remains information of the prepaid card 87 to update
20 the prepaid card 87 thereby to effect settlement of the
accounts for the commodity 50.

In this instance, when it is determined that the
remains information of the prepaid card 87 is short,
that is, when the determination at step F8 is YES, the
25 shortage of the remains is notified by the notification
section 51B and displayed on the display section 54, and
the customer thus refers to the display and selects

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1 whether it depresses the purchase continuing key of the
keyboard section 55 and inserts a second prepaid card 87
into the communication section 83 to continue the
purchasing processing (determination of YES at step F9)
5 or it depresses the end key of the keyboard section 55
to end the purchasing processing (determination of NO at
step F9).

When the continuing processing is selected, the
remains information of the first prepaid card 87 is
10 updated to "0" by the communication section 83b and the
prepaid card 87 is discharged from the communication
section 83c (step F10), and then the remains information
of the second prepaid card 87 inserted by the customer
is read by the communication section 83a and displayed
15 on the display section 54 (step F11).

The processes at the steps F5 to F11 are
repeated until the customer depresses the end key of the
keyboard section 55 to effect inputting of ending of use
(step F12).

20 After the customer depresses the end key of the
keyboard section 55 to end its purchasing (when the
determination at step F9 is NO or when the determination
at step F12 is YES), it is determined whether or not the
receipt issuance key of the keyboard section 55 is
25 depressed (step F13). When it is depressed, the
registered data in the storage section 52 are printed by
the printer 84 to issue a receipt (step F14).

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1 After issuance of a receipt or determination of
NO at step F13, the registered data in the storage
section 52 are transmitted to the upper control section
by way of the communication section 53 by the main
5 control section 51A (step F15), and then the prepaid
card 87 is discharged by the communication section 83c
(step F16). Then, the customer receives the receipt
from the printer 84 and the prepaid card 87 discharged
from the communication section 83, thereby completing
10 the settlement processing of the accounts.

 It is to be noted that, in the scanning cart 100
in the present embodiment, when the business of the
store starts, the power is automatically supplied by the
main control section 51A in response to a power-on
15 instruction transmitted from the upper control section,
and when the business of the store ends, the power
supply is automatically stopped by the main control
section 51A. In other words, the power on/off of the
scanning cart 100 can be managed without artificial
20 operation of a customer, an operator or some other
person.

 In this manner, according to the sixth
embodiment of the present invention, since final
settlement of accounts, which is conventionally
25 performed by a settlement POS terminal, can be performed
by self service using a prepaid card 87, not only
reduction of the burden on an operator and reduction of

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1 the number of operators can be achieved, but the waiting
time at a settlement POS terminal is eliminated at all
and a disagreeable feeling arising from such waiting
time is not given to a customer. Accordingly,
5 remarkable reduction of the shopping time and/or
remarkable enhancement in convenience in a self shopping
form can be realized.

Further, according to the present embodiment,
since, when it is determined by the weight determination
10 section 51a or the sensor 85 that a commodity 50 has
been accommodated into the basket section 102 without
scanning the bar code 50a, a sounding operation of the
buzzer 59 and an alarm display of the display section 54
are immediately performed there to give a warning to the
15 customer, such an unjust act that a customer carries out
a commodity without performing reading of the commodity
code whether it is intentional or accidental can be
prevented with certainty in a POS system wherein all
steps up to final settlement of accounts are performed
20 by self service.

It is to be noted that, while, in the embodiment
described above, data are updated by the communication
section 83b each time commodity code information is read
by the scanner 57, another construction wherein, after
25 completion of the shopping, a total amount of money for
commodities purchased in the current shopping is
calculated in accordance with registered data registered

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1 in the storage section 52 and the total amount of money
is subtracted from the remains information at the
communication section 83b may be employed alternatively.

Further, while, in the embodiment described
5 above, a prepaid card 87 is used, another construction
that a credit card or a bank card is used in place of
the prepaid card 87 and the payment is deferred while
the settlement of accounts is performed by self service
may be employed alternatively. In this instance, in
10 place of the communication section 83 and the
notification section 51B shown in FIG. 29, a magnetic
card reader 88 and an automatic clearing processing
section 51C are provided as shown in FIG. 33.

In particular, the magnetic card reader 88
15 includes a magnetic card data reading section 88a for
receiving a magnetic card 89 such as a bank card to read
magnetic information of the magnetic card 89, and a card
discharging section 88b for discharging such magnetic
card 89 after completion of the processing.

20 The automatic clearing processing section 51C
calculates, after completion of shopping, when a
personal identification number inputted from the
keyboard section 55 by a customer and personal
identification number data included in the magnetic
25 information from the magnetic card data reading section
88a coincide with each other, a total amount of money of
commodities purchased in the current shopping in

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1 accordance with registered data registered in the
storage section 52 (prices of the commodities 50
retrieved by the commodity information retrieval section
51f), and transmits automatic clearing processing data
5 to the upper control section by way of the communication
section 53 so that the amount of money may be
automatically paid later from an account corresponding
to the magnetic information from the magnetic card data
reading section 88a.

10 With such construction, final settlement of
accounts can be performed by self service even where a
magnetic card 89 such as a bank card or a credit card is
used.

It is to be noted that, where the magnetic card
15 reader 88 and the automatic clearing processing section
51C described above are provided together with the
communication section 83 and the notification section
51B, the scanning cart 100 on which settlement of
accounts can be performed using any of a prepaid card 87
20 and a magnetic card 89 such as a bank card or a credit
card can be constructed.

Further, while, the commodity information file
86 in the embodiment described above is provided in the
control system of the scanning cart 100, the commodity
25 information file may alternatively be provided in the
upper control section. In this instance, retrieval of
price information is performed by way of communications

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1 between the commodity information retrieval section 51f
and the upper control section having the commodity
information file by way of the communication section 53.

Further, while, in the embodiment described
5 above, commodity code information read from the bar code
50a of a commodity 50 by the scanner 57 is registered or
stored into the storage section 52 in the scanning cart
100 by the commodity code registration section 51i,
another construction wherein the commodity code
10 information is transmitted to the upper control section
by way of the communication section 53 so that it may be
stored into the storage section of the upper control
section may alternatively be employed.

Furthermore, while, in the embodiments described
15 above, a purchased commodity accommodating and
transporting apparatus having a self scanning function
of the present invention is a shopping cart, the present
invention can be applied to a shopping basket or the
like in a similar manner as described above. Also in
20 this instance, similar effects to those of the
embodiments described above can be obtained.

The present invention is not limited to the
specifically described embodiment, and variations and
modifications may be made without departing from the
25 scope of the present invention.

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